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PREVENTION OF MOTHER TO CHILD HIV TRANSMISSION IN RESOURCE-LIMITED AREAS

-A Literature Review



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PREVENTION OF MOTHER TO CHILD HIV TRANSMISSION IN RESOURCE-LIMITED AREAS_

(Abstract)

Aim of review, and review question: The aim of this review was to gather comprehensive knowledge on HIV mother-to-child transmission prevention and describe current preventative methods. *What are the current methods in preventing Mother to Child HIV transmissions in healthcare resource limited areas?* – was the question the review sought to answer.

Method: A literature review of current research and recommended applications on the field in suppressing the spread of HIV with CINAHL and PUBMED databases used as main sources of research articles.

Preventative measures (results): The results were grouped into general themes that covered: Good nutrition, prophylactic combination therapy, preventing micro-transfusions risks between foetus and mother by avoiding invasive procedure on foetus, **and** preventing contact/ duration of contact between infant and mother's blood and other bodily fluids. The methods of prevention include: Antiretroviral suppression of viral load in blood and mucus secretion in birth canal, Minimise delay between membrane rupture and birth, Treating ulcerative STDs before delivery, C-section birth (extremely costly), and Exclusive breastfeeding in absence of suitable and affordable formula feeding.

Nursing considerations: There are different levels of poverty in resource-limited areas which affect prevention of MTCT. Nurses should give individualised education about prevention.

KEYWORDS:

HIV prevention, Mother-to-child transmission, HIV, resource-limited areas, exclusive breastfeeding

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HIV- TARTUNTOJEN ENNALTAEHKÄISY ÄIDILTÄ LAPSELLE KÖYHILLÄ ALUEILLA - KIRJALLISUUSKATSAUS

Tiivistelmä

Katsauksen tarkoitus ja tutkimuskysymys: Katsauksen tarkoituksena oli koota kattavasti yhteen tietoa keinoista ehkäistä HIV-tartunnan siirtymistä äidiltä lapselle ja kuvailla ajankohtaisia menetelmiä tartuntojen estämiseksi. Mitkä ovat nykyiset keinot ehkäistä HIV-tartuntojen siirtymistä äidiltä lapselle vähäisten terveydenhuolto resurssien puitteissa? Katsauksen tarkoituksena oli vastata tähän kysymykseen.

Menetelmä: Kirjallisuuskatsaus tämänhetkiseen alan tutkimukseen ja toimintasuositukseen koskien HV:n leviämisen estämistä, hyödyntäen pääasiassa artikkeleita CINAHL- ja PUBMED-tietokannoista.

Ehkäiseviä keinoja (tulokset): Saadut tulokset koottiin pääteemoittain, sisältäen seuraavat aihealueet: hyvä ravitsemus, profylaktinen yhdistelmähoito, sikiön ja äidin välisten mikroverensiirtojen riskien vähentäminen välttämällä sikiötä vahingoittavia toimenpiteitä, ja lapsen ja äidin veren ja muiden ruumiinnesteiden kontaktin välttäminen tai kontaktin keston vähentäminen. Tartunnan ehkäisemisen menetelmiin kuuluu: antiretroviraalinen virusmäärän tukahduttaminen synnytyskanavan veren- ja limanerityksessä, sikiökalvon puhkeamisen ja syntymän välisen ajan minimointi, haavaisten sukupuolitautilien hoitaminen ennen synnytystä, keisarileikkaus (äärimmäisen kallis vaihtoehto), ja yksinomainen imetys sopivien ja edullisten äidinmaidonkorvikkeiden puuttuessa.

Huomioita hoitotyöhön: Vähäisten ja rajoitettujen resurssien alueilla ilmenee monen tasoista köyhyyttä, mikä vaikuttaa äidiltä lapselle siirtyvien tartuntojen ehkäisyyn. Sairaanhoidajien tulisi antaa yksilöityä koulutusta ennaltaehkäisemisestä.

ASIASANAT:

HIV:n ehkäiseminen, tartunnat äidiltä lapselle, HIV, köyhillä alueilla, yksinomainen imetys

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LIST OF ABBREVIATIONS (OR) SYMBOLS

ART:	Antiretroviral therapy
ARV:	Antiretroviral
AIDS:	Acquired immune deficiency syndrome
CBS:	Community based support
ECS:	Elective Caesarean Section
EBF:	Exclusive breastfeeding
EFF:	Exclusive formula feeding
HAART:	Highly active ART
HIV:	Human immunodeficiency virus
HIV-1:	Human immunodeficiency virus type 1
HIV-2:	Human immunodeficiency virus type 2
MTCT:	Mother-to-child transmission
PMTCT:	Prevention of mother-to-child transmission
UNICEF:	United Nations Children's Emergency Fund
UNAIDS:	The Joint United Nations Programme on HIV and AIDS
WHO:	World Health Organization

1 INTRODUCTION

The pandemic of the acquired immune deficiency syndrome (AIDS) is caused by the human immunodeficiency virus type 1 (HIV-1). There are two main strains of HIV: HIV-1 which is the more common type and has caused the majority of infections and AIDS cases and is what is usually implied when mention of HIV is made generally. HIV-2 is a rarer form of the virus and is concentrated in selected countries mainly in West Africa. Given the simplicity of the virus, they mutate much more easily than more complex forms of life and hence have been known to differ from individual to individual and even to mutate within an individual over the course of the disease. There are other more obscure forms of the virus in humans and primates but these two are responsible for the global epidemic (WHO 2016.)

AIDS represents one of the most serious health crises in the world; there are 34 million people infected worldwide, with more than 15.4 million about half of the population being women (WHO 2014). The growth of AIDS cases among women has as a consequence, the increase in mother-to-child transmission (MTCT) of HIV infection hence MTCT is considered the most common etiology for pediatric AIDS. Almost all AIDS cases in children under 13 years of age have vertical transmission of HIV as their source of infection (Cruz et al. 2013). Without preventive interventions approximately one-third of infants born to HIV-positive mother's contract the virus, becoming infected during their mother's pregnancy, childbirth or breastfeeding. The rate of MTCT transmission of HIV, without any intervention, stands at around 25.5%, and it is possible to reduce this to levels between 0% and 2%, by means of preventive interventions. (Cruz et al. 2013.)

Currently, HIV infection is incurable. However effective antiretroviral (ARV) drugs can control the virus and help prevent transmission. Also the risk of MTCT can be reduced by interventions that include ARV prophylaxis given to women during pregnancy and labour and to the infant in the first weeks of life. Recently WHO advised HIV-positive mothers to avoid breastfeeding if they were able to afford, prepare and store formula milk safely. With these interventions it is good news

that new HIV infection among children were reduced by 58% from 2000-2014 in the western world. (UNAIDS 2015.)

On the other hand, 95% of vertical transmission of HIV occurs in resource limited areas. Every minute an infected infant is born in spite of the fact that vertical transmission is largely preventable, mainly because translating knowledge into practice is not always feasible. This has led to continuous growing numbers of children with HIV, thereby making pediatric HIV a looming problem rapidly draining the already burdened health care system of these countries. (Lala & Merchant 2010.)

Resource limited areas although not strictly limited to economically poor countries are in most cases synonymous with them. They are usually characterised by crippling levels of financial poverty which the World Bank defines as anyone living on below USD 1.90 per day adjusted for regional variations in purchasing power (The World Bank 2015). These countries also rank low on the human development index which measures not just income levels but uses quality of life measures to gauge the level of human development. For example, life span, levels of education, and infant mortality rates (UNDP 2015). Resource limited countries are characterised by insufficient levels of adequately equipped healthcare facilities such as hospitals and clinics and shortage of well-trained personnel to staff them or provide education at the community level. They are also plagued by high level of illiteracy and health related challenges making the need for research into disease prevention in such locations necessary for advancing global prosperity. Most are located in Africa, South America and Asia. They are sometimes referred to as developing countries.

The aim of this literature review is to find out HIV MTCT preventive methods currently in use in resource-limited areas. At the same time, deepening the knowledge by understanding those common factors that affect prevention of mother to child transmission (PMTCT) of HIV and synthesise the evidence-based knowledge.

2 BACKGROUND

MTCT also referred to as vertical transmission is the transmission of the HIV virus from mother to the child. This transmission occurs at an estimated rate of 15 to 30% in developed countries and increases to 30 to 45% in developing countries representing as the major cause of AIDS in children (Lala & Merchant 2010). The transmission can occur at three different times; Prepartum (in uterus), due to feto-maternal blood shunts within the placenta; Intrapartum (during delivery), when neonates pass through the birth canal and are exposed to infected maternal blood and genital secretions and Postpartum: during breastfeeding which accounts for up to 40% of infant infections because both cell-free and cell-associated viruses have been detected in breast milk. (Da Silva et al. 2013; Milligan & Overbaugh 2014.)

A breach in the maternal-infant blood barrier, otherwise known as placental micro transfusion is believed to facilitate MTCT. The exact cause of placental micro transfusions still remains unknown, they have been associated with contractions during the early stages of labor when membranes rupture and ultimately result in the exchange of small amounts of maternal and fetal blood. This exchange may result in the transfer of HIV-infected cells from the mother to child, increasing infection risk for the infant. Furthermore, a majority of transmission events are believed to occur across infant mucosal surfaces, such as gastrointestinal tract and nasopharyngeal surfaces. Throughout gestation, delivery, and the breastfeeding these mucosal barriers are in constant contact with HIV-infected maternal fluids providing sufficient time and chance for transmission to occur. (Milligan & Overbaugh 2014.)

The risk of HIV transmission from mother to child is the highest at the end of pregnancy and the vast majority of infections are occurring during labour and delivery. Generally the risk of infection in prepartum period is at 20%, during delivery is 45-50% and 30-35 % in the post-partum period. In industrialized nations the risk is at 15-25 % and that of developing countries is 25-45%. This difference

is largely caused by transmission by breastfeeding by HIV positive women in the developing countries. (Weinberg 2000.)

Sexually transmitted diseases can lead to vaginal ulceration which can increase the amount of HIV infected fluid in the birth canal. Maternal tuberculosis has also been shown to be associated with increased risk of mother to child transmission. Research undertaken in India showed an almost threefold increase in transmission rates between tuberculosis infected HIV positive mother and child (30%) relative to HIV-positive non-tuberculosis infected mother and child pairs (12%). (Gupta et al 2011.)

Malnutrition resulting in nutrient deficiency during pregnancy causes deterioration in the overall health of the mother reducing the level of immune response to the presence of the HIV virus. Reduced viral suppression means increased plasma viral load and reduced effectiveness of antiretroviral therapy thus increasing the risk of vertical transmission.

This review seeks to add to the existing body of knowledge available for nursing students and other professionals involved in the prevention of the spread of HIV. As implied in the term “review”, the aim is to “look again” at what has been found, said and written about the vertical transmission of HIV and to apply recommended academic practices in producing a paper of scientific nature.

3 THE PURPOSE, AIM AND RESEARCH QUESTION

The purpose is to gather comprehensive knowledge on HIV mother to child transmission prevention and describe current preventative methods.

This review seeks to add to the existing body of knowledge available for nursing student and other professionals involved in the prevention of the spread of HIV. As implied in the term “review”, the aim is to “look again” at what has been found, said and written about the vertical transmission of HIV and to apply recommended academic practices in producing a paper of scientific nature.

This review discusses practices in both developed and developing countries but the main focus is on resource limited areas also referred to as developing countries in this review.

The research question is:

What are the current methods in preventing Mother to Child HIV transmissions in resource limited areas?

4 METHODOLOGY

Permission for this review was granted by TURUAMK (refer to appendix 1)

Given the constantly evolving nature of research into HIV and Acquired Immune deficiency Syndrome, AIDS, the majority of research articles used were produced within the last decade but some landmark articles from the earlier decade which influenced the more recent research works were also included to provide a wider and longer range view of the topic. Reliability and currency of information is the main reason for setting a time limit on the included source materials.

CINAHL and PUBMED databases were the primary sources of material reviewed in this paper. These are of notable merit as sources of reliable scientific research publications and access to them was available for the review. Other sources relied on are nursing and medical sciences textbooks.

The research topic and questions are formulated using the PICO framework of Population, Intervention, Comparison, and Outcome. "Mother-to-child", that is HIV positive mothers or soon-to-be mothers are the target study population. "Prevention" looks at the various interventions in the transmission of the virus. Higher transmission rates in "resource limited areas" provides a comparison to the successes in lowering the rate of transmission in wealthier regions. The targeted outcome of the question is the result of prevention which is the lower rate of vertical transmission.

Search terms used were "prevent*AND mother-to-child transmission" or "vertical transmission AND HIV". Search terms were truncated to allow for the inclusion of more articles. "English", "2005 to present" (except for landmark articles some of which are older) and "full text" were the secondary search limiters used in the process (see appendix 2). Given the volume of research articles used in this process, a table (see appendix 1) summarizing the relevant projects was produced to provide a quick overview and facilitate the data collection process. A column on the limitations of included articles was included in the process to provide objectivity and a large enough sample size of 17 of the most relevant articles were

used as basis of the results and provide adequate coverage of the subject. The quality of articles included were graded in decreasing level of reliability: First level research reports are large randomized control trials (RCT); second studies are RCTs with 50 subjects or less; the third level is made up of smaller cohort or case-control and cohort studies; fourth level evidence comes from case reports and low-level case-control and cohort studies; and the fifth level is reports based on expert or consensus based on experience, physiological or biological principles. (Polit & Beck 2012).

A critical appraisal checklist for assessing included articles were (adapted from Rew 2010):

1. Is the research report relevant to HIV MTCT prevention?
2. What are the research questions and purpose or objects of the paper?
3. Is the research methodology evidence-based? Does it adequately assess the aims of the project?
4. Is the sample size big enough and relevant to the research aims?
5. What outcomes does the paper produce? Does it answer the questions it sets out to answer?
6. What are the limitations of the research?

5 METHODS OF PREVENTION

Results from this review are discussed under subtopics of various prevention methods used in PMTCT in three phases of pregnancy. Though practice differ from country to country, the general recommendations for both the developed and developing and resource restrained settings are discussed. However it is important to note that MTC of HIV-1 may happen at any time of pregnancy, hence an understanding of the time and mechanisms of transmission is crucial for designing intervention strategies.

5.1 Prevention before delivery

In the pre-delivery phase of pregnancy, the use of ARTs is the major way of reducing MTCTs. Treatment of women and their children with antiretroviral during the course of pregnancy and breastfeeding has dramatically lowered the risk of MTCT, by reducing maternal viral burden and by providing prophylaxis to the infant. There is a positive link between maternal prenatal viral load and the risk of both in utero and intrapartum transmission. (Milligan & Overbaugh 2014, Chappell & Cohn 2014.). ARV drugs suppress viral replication in the body assisting the individual's immune system to strengthen and regain the capacity to fight-off infections. WHO recommends that, antiretroviral treatment should begin as soon after diagnosis as possible for those who are HIV infected (see appendix 4). Providing ART to all pregnant and breast feeding women living with HIV serves three synergistic purposes: improving individual health outcomes, preventing MTCT of HIV, preventing the horizontal transmission of HIV from the mother to an uninfected sexual partner (WHO 2015).

ARVs also decrease viral mutations and can reduce mother-to-child transmission of HIV either by lowering plasma viral load in the mother and providing post-exposure prophylaxis for the newborn. Initially, monotherapy which is the use of a single antiretroviral agent usually consisting of single-dose Nevirapine provided

to the mother and infant near birth could decrease transmission by half, presumably by reducing both intrapartum (during labor/delivery) and early breast milk infections.(Milligan & Overbaugh 2014.)

However, monotherapy has shown to lead to HIV drug resistance and the spread of resistant strains of the virus is expected to increase with the increasing adoption of antiretroviral therapy. To combat this, the current standard for antiretroviral therapy is highly active antiretroviral therapy (HAART), which is composed of three or more antiretroviral agents. Combination therapy as it is sometimes referred to uses a mixture of Zidovudine, Lamivudine and/or Nevirapine depending on the current health situation of the particular patient and their history of HIV treatment as appropriately assessed by their health personnel. This form of ART when used during pregnancy and breastfeeding can reduce transmission risk to less than 5% and child morbidity in general. It also leads to a maximization of viral suppression, increased therapeutic efficiency and durability, and the delaying of the development of drug resistance which ultimately leaves more options for future HIV therapy open. (Hammer et al. 2008, Schwartz et al. 2015.) However in low- and middle-income countries HAART is not always available. Various simpler and moderately cheap ART regimens have been provided to pregnant women and their newborn babies. The efficiency of such regimes still remains unknown.

It is recommended that pregnant women currently not on antiretroviral therapy start after gestation week 14 and the assessment criteria are the same as those for non-pregnant patients. Before starting therapy, consideration should be given to: the patient's consent and willingness, the current HIV viral load, state of her immune system as shown by a CD4+ cell count, and medical history. Socioeconomic factors should also be considered to assess the risk of catching opportunistic infections and, the prevention of drug resistance. Improvement of overall maternal health, quality of life and outlook should be the primary goal of HIV therapy. If any reason ART is stopped, all antiretroviral medications should be stopped and restarted at the same time. (Madger et al. 2005.) The main way to monitor response to ART was through either clinical or immunological (CD4 cell count). (WHO 2015.)

5.2 Prevention during delivery

Elective caesarean section (ECS) before the onset of labour has decreased the risk of HIV transmission by approximately 50% (Navéér et al. 2011). ECS reduces MTCT rates by preventing the neonate from coming into direct contact with infected maternal fluids and secretions during labour since the majority of HIV transmission appears to occur near or at the time of delivery when foetal exposure to maternal body fluids is most likely. (Madger et al. 2005). The recommendation is that ECS is carried out before the mother goes into labour and membrane rupture and this is to take place at 2-3 weeks before expected date of delivery. All ARTs should still be taken in regular doses before the operation and antibiotic prophylaxis is same as in non HIV infected mothers (Navéér et al. 2011)

ECS is beneficial compared to vaginal delivery because the risk of transmission may increase during complicated vaginal delivery, for instance when instrumental procedures are necessary, when labour is prolonged, or when a long time passes between the rupture of the membranes and delivery. These complications are more common in first time deliveries. Practicalities such as the possibility of prior planning, daytime delivery and the availability of experienced staff, are factors in favour of an elective caesarean section (Navéér et al. 2011).

Vaginal delivery is not recommended for HIV infected mothers however given the cost and risk of complications such as thrombosis, infection and hemorrhage involved in any major operation, and the lack of resources to manage such complications especially in developing countries, the routine use of caesarean sections may not provide an increase benefit when post-operational mortality rates are taken into account. In such inevitable cases ways to increase the safety of vaginal birth are of particular relevance. The requirement is that the mother should have no history of previous uncomplicated vaginal deliveries, and should be on a well-functioning antiretroviral treatment, with undetectable viral load and no obstetric risk factors.

Reducing the viral load in the vaginal canal during vaginal birth significantly reduces the risk of intra-partum transmission of HIV. HAART has proven to significantly lower the level of HIV viral load in vaginal discharges hence reduces the risk of transmission. In effect, discussions have taken place to determine whether elective caesarean section is still necessary to mothers who have had HAART and have a possibly lower transmission rate because of undetectable viral load that has been reached through HAART regimes. (Navéér et al. 2011.)

5.3 Prevention after delivery

WHO recommends all mothers, regardless of their HIV status to practice Exclusive breastfeeding (EBF) “*which means no other liquids or food are given – in the first six months of life to achieve optimal growth, development, and health*”. Thereafter infants should receive nutritionally adequate and safe complementary foods while breastfeeding continues up to 24 months or beyond. However, given the need to reduce the risk of HIV transmission to infants and minimizing the risk of other causes of morbidity and mortality, the guidelines also state that “*when replacement feeding is acceptable, feasible, affordable, sustainable, and safe*”, Exclusive Formula Feeding (EFF) which implies avoidance of breastfeeding by HIV-infected mothers is recommended.(WHO 2010.) Hence in the developed countries where healthy and affordable replacement formula feeding is available HIV positive mothers are strongly counselled not to breastfeed their infants. Thus infants are fed with formula milk or donated breast milk while at the same time the mother receives anti-lactation medication. This seems to be the surest way to prevent infants from contacting maternal virus in breastmilk.(HIV tukikeskus 2015.)

On the other hand, in developing countries where there is the societal context of unsafe water and unsanitary or nutritionally deficient home-modified animal milk substitutes resulting in risks of infant death due to diseases such as diarrhea and malnutrition coupled with high costs of breast prohibitive milk substitutes as well

as risk of stigmatization that accompanies not breastfeeding, EBF has been recognized and remains the only feasible and sustainable option for the infant to receive the nutrients and antibodies needed to survive. For an individual HIV-infected mother, it is a very challenging situation to balance the risks and benefits. A study in Brazil reported that even though majority of participants, 29 out of 30 had adopted EFF they were faced with challenges: difficulty reconciling their perceptions that breastfeeding is an important maternal responsibility, trouble accepting that breastfeeding can cause potential to harm their infants, confronting HIV-related stigma associated with EFF, and unexpected financial burdens due to EFF. (Maccarthy et al. 2013). Reasons resulting in non-adherence to EBF in a study conducted in Kenya included demographic and socioeconomic factors, breastfeeding complications such as mastitis and mothers limited knowledge on express milk for babies while they are away.(Koima et al. 2014). Postpartum counselling for HIV-positive women which includes information about the risks and benefits of various infant feeding options based on local assessment and guidance in selecting the most suitable option for their situation. Proper feeding techniques, management of complications such as subclinical mastitis as well as psychological support and coping strategies should be covered in these postnatal counseling sessions. Enforcing treatment of clinical mastitis with antibiotics, and expressing and discarding breast milk from the affected breast while also continuing feeding from the unaffected breast, and treating infant oral thrush or nipple candidiasis with nystatin can all help reduce MTCT of HIV. (Kuortis et al. 2007.) HIV viral component in breast milk could also be inactivated either by chemical means or heat. A preclinical study of treating breast milk with Sodium dodecyl sulphate has shown some promise. Boiling or pasteurization of breast milk appears to decrease HIV infectivity of milk. Pretoria pasteurization, in which breast milk in a glass jar is placed in boiling water for 12-15 minutes, is a simple method for maintaining breast milk at 56-62.5°C by heat transfer. This method, which can be done in the home has been shown to reduce bacterial contamination of unrefrigerated breast milk for up to 12 hours. (Kuortis et al. 2007)

5.4 Factors that influence PMTCT

In addition to those clinical risks factors mentioned above, there are other considerations that also have an effect on PMTCT. In this part, some main issues that result in successful PMTCT are discussed.

5.4.1 Male partner

It is one key factor in PMTCT that significantly influences the effectiveness of HIV-positive women's adherence to antiretroviral therapy during and after pregnancy (Hampanda 2014). Therefore, male involvement plays an important role in PMTCT (Tilahun & Mohammed 2015; Hampanda 2016). According to the study conducted in 2015 with the sample n=700 in Ethiopia, 53% of them were found to be involved in PMTCT (Tilahun & Mohamed 2015). This level of involvement is higher than other studies from East Africa (Semrau et al.2005), in Uganda (Sarker et al 2007), only 16% of the sample participate in PMTCT and male involvement is correlated with increased uptake of HIV testing and preventive intervention for vertical and sexual transmission. In a similar study in Kenya (Tweheyo et al. 2010) male involvement only accounts for 15% of the sample. It was shown that women accompanied by their partner for HIV testing were three time more likely to return for antiretroviral prophylaxis. (according to Tilahun & Mohamed 2015.)

In the cases of intimate partner violence, there was a decrease in adherence to PMTCT during and after pregnancy in Uganda. The way adherence to PMTCT was effected by intimate partner violence differed by violence types. Emotional and sexual violence had a more pronounced effect on non-adherence than physical violence. Experiencing physical violence decreases the rate of adherence to infant prophylaxis after delivery (62% with n=320). While women suffering from emotional violence had a 90% reduced chance of adherence to their medication, as well as 90% reduced chance of giving the infant prophylaxis. (Hampanda 2016.)

5.4.2 Health care workers

PMTCT has been regarded as a comprehensive set of interventions that demand capable health workers (Aishat & Olubunmi 2016). It is obvious that health workers play an important role in the successful achievement of PMTCT. In a study carried between 2009 and 2012, of the 1105 mother-infant pairs included, 264 (23.9%) received community based support (CBS). Those who got CBS had improved antenatal ART initiation, initiated ART and Zidovudine with less delay, and the risk of stillbirth was lowered. (Fatti et al. 2016.) In line with these findings, the use of peers, community lay persons and village health team members resulted in a significant rise in six-week postnatal follow-up of HIV infected women and early infant HIV diagnosis in urban and rural health units in Uganda. (Namukwaya et al. 2015.)

However, appropriate implementation of PMTCT services demands adequate knowledge and appropriate attitudes and practices on the part of the health care providers especially in rural areas where access to health care delivery is very limited (Aishat & Olubunmi 2016). Knowledge level of HIV/AIDS –PMTCT along with respondents' background (including marital status, sex, time spent in the current hospital and religion) showed no significant correlation except the fact that health care workers who were Christian were two times more likely to be knowledgeable about PMTCT than the Muslims one. This religion findings are in line with the study published in Ghana (Boateng et al 2013, according to Aisha & Olubunmi 2016). At the same time, respondents who had worked less than 5 years in the current hospital were four times less knowledgeable than those who had spent more than 5 years and they were three times less likely to have good attitude towards PMTCT as well (Aishat & Olubunmi 2016).

Many HIV-affected individuals and couples want to reproduce. However lack of information and knowledge can cause fear. Hence, the role of the healthcare provider in providing information and resources is to help them safely conceive while minimizing the risk of sexual and perinatal HIV transmission (Mmeje et al. 2016.)

5.4.3 Early detection of maternal HIV infection

Good assessment of the risks of MTCT HIV infection in resource limited areas can result in reducing child morbidity and mortality rates as well as reinforcing PMTCT. Testing pregnant women for HIV, if possible during their first pregnancy visit is the first step for PMTCT. (Wudine & Damtew 2016.) Early detection of maternal HIV infection in pregnancy focused on voluntary counselling and testing as the primary means of providing testing and foster people to turn into concerned of their HIV status (Baset 2002, according to Abtew et al. 2015). A study conducted in Brazil revealed that low level of antenatal screening and access to PMTCT were major limitations in the PMTCT (Patrico et al, 2015).

5.4.4 Other factors

HIV-infected mother's knowledge of HIV MTCT also plays a crucial role to the success of PMTCT. HIV infected women are found to be more knowledgeable of MTCT and PMTCT than those who are not (56%vs 45% with n=10299 in an investigation from 2011-2012 in Tanzania) (Haile et al. 2016). However knowledge about HIV/AIDS and PMTCT may not be sufficient to guarantee behavioral change (Abtew et al. 2015).

Food insecurity is also a factor that may influence PMTCT. Food insecurity is defined as "*the lack of physical, social, and economic access to sufficient food for dietary needs and food preferences*". However food insecurity was not associated with maternal or infant receipt of ARV prophylaxis although the same study found that there may be a link when food insecurity is severe. Among HIV-exposed infants, 13.3% of those born to women who reported severe household food insecurity were HIV infected compared to 8.2% of infants whose mothers reported food secure household (n=8790 women). (McCoy et al. 2015.)

6 DISCUSSION

In undertaking this review, we sought to understand two main things: where current research stands on vertical transmission of HIV in developed countries and resource limited regions and how that compares to on-going practices on the field and recommendations from international agencies such as the United Nations and its various branches. Our review considered best practices in general and how evidence-based practice is implemented.

Although the use of ART during pregnancy and post-delivery gives strong public health benefits in term of parental health and PMTCT, the possible long-term harm for fetal and infant exposure to maternal drug is badly understood (WHO 2015). A review article published in Sweden suggests that ART treatment sometimes causes adverse effects, e.g. gastrointestinal problems, anaemia and fatigue to the mother; these can be particularly difficult to evaluate and manage during pregnancy, since the same symptoms are typical of pregnancy itself. Generally, the effect of short-term exposure to antiretroviral drugs on the progression of disease in HIV-infected women is not known. Nor is the long-term effect of fetal exposure to antiretroviral nucleoside analogues, although many infants born now to HIV-infected mothers are exposed during intrauterine and early neonatal life. There is a scarcity of data on the pharmacokinetics and safety of agents other than Zidovudine during pregnancy. The safety of antiretroviral drugs is a key issue for the management of HIV-infected pregnant women. It was recently reported that there might be an increased risk of premature delivery associated with the use of combination therapy during pregnancy, especially when protease inhibitors were included. Three cases of lactic acidosis resulting in maternal deaths and four non-fatal cases in pregnant women have been reported; all the women received a combination of ARV's. (Navéér et al. 2011.)

A significant issue this paper highlights is the need to reduce infant and maternal mortality while preventing the transmission of the human immunodeficiency virus. Guidelines on breastfeeding without the constraint of resource limitation states that breastfeeding should be completely avoided and the baby should be fed on

infant formula that meets the nutritional needs of the child (Boer et al. 2010). In parts of the world where optimized alternative infant nutrition can be provided regularly and of suitable quality, this is straightforward. But infant formula of the right quality and quantity is beyond the reach of most families in resource-poor areas where even portable water is unavailable. In such a situation, exclusive breastfeeding provides a higher chance of survival than the high risk of mortality resulting from malnutrition and infection resulting from the consumption of unclean water. (WHO 2016.)

The treatment of ulcerative sexually transmitted illnesses before delivery has also proven to be effective and a method of prevent vertical transmission. Ulcers in the vaginal increase the present blood and mucus membranes secretions. The increased amount of virus-rich blood or other secretions increases the risk of transmission. (Celum et al. 2004). Thus, antenatal screening for other sexually transmitted diseases would be a cost-effective method of prevention.

The role of adequate maternal nutrition in prevention of HIV transmission cannot be overstated. Poor maternal nutrition decreases immune resilience leading to an increased rate of disease progression (Maayer & Saloojee 2011). The weaker the mother's immune system is, the more advance the stage of the infection and the higher the viral load in the blood secretions of the mucus membranes in the birth canal, proportionately increasing the chances of infected the baby. Invasive procedures on the fetus must be avoided as these might break the mother-child blood barrier and lead to pre-partum infection.

Limiting infant exposure to infected maternal fluids (including blood, cervicovaginal fluid, and breast milk has been shown to reduce the risk of MTCT Similarly, ECS conducted prior to the onset of labor and membrane rupture, avoid infant exposure in the birth canal and reduce risk of transmission.(Milligan, Overbaugh 2014)

6.1 Limitations of review process

Language of search: All article included in the review were in English thus excluding all research published in other languages. Given that significant amount of research into HIV is carried out in non-English speaking regions of Africa, Asia and South America, this excludes findings from a great portion of the world that is involved in the topic.

Inexperience of researchers: Although guidelines and procedures are followed as closely as possible, none of the researchers involved in the collection and synthesis of information to produce this paper had research backgrounds. That limitation might show in the overall quality and presentation of the results. Our inexperience also showed in the lack of proper time management and project planning. More training, practice and implementation of lessons learnt is necessary before undertaking future projects

Database access: Due to the nature of the agreements between the Turku University of Applied Sciences and the database services providers, full access to all articles was not possible thus necessitating the rejection of some relevant ones for lack of availability of full texts or necessity for further payments to be made before.

6.2 Conclusion

Within resource limited areas, people live and experience different levels of poverty and resource deprivation and hence have access to varying levels of healthcare and health education. Nurses in general, and those working in such areas in particular must be aware of the specific circumstance of the person seeking their care in order for them to be able to provide assistance that is relevant to the needs of the person. Thus providing individualized care should be the main focus of nursing care in such areas. Future research should focus on the side effects of ARV,s on both mothers and their infants. Both long term and short term

complications on mothers and infants as well as fetal exposure to these ARV,s are also important issues that could be considered.

REFERENCE

1. Arvold, N.D., Ngo-Giang-Huong, N., McIntosh, K., Suraseranivong, V., Warachit, B., Piyaworawong, S., Changchit, T., Lallemand, M. & Jourdain, G. 2007, "Maternal HIV-1 DNA load and mother-to-child transmission", *AIDS Patient Care & STDs*, vol. 21, no. 9, pp. 638-643 6p.
2. Catherine A. Chappell & Susan E. Cohn, 2014 Prevention of Perinatal Transmission of Human Immunodeficiency Virus, *Infect Dis Clin N Am* 28(2014) 529-547
3. Celum, C., Levine, R., Weaver, M. & Waid, A. 2004, "Genital herpes and human immunodeficiency virus: double trouble", *Bulletin of the World Health Organization*, vol. 82, no. 6, pp. 447-453 7p.
4. Cruz Rodrigues, S.T., Rodrigues Vaz, M.J. & Oliveira Barros, S.M. 2013, "Vertical transmission of HIV in the population treated at a reference center", *Acta Paulista de Enfermagem*, vol. 26, no. 2, pp. 158-164 7p.
5. da Silva, R.C., Bedin, E., Mangano, A., Aulicino, P., Pontillo, A., Brandão, L., Guimarães, R., Arraes, L.C., Sen, L. & Crovella, S. 2013, "HIV mother-to-child transmission: A complex genetic puzzle tackled by Brazil and Argentina research teams", *Infection, Genetics and Evolution*, vol. 19, pp. 312-322.
6. De Maayer, T. & Saloojee, H. 2011, "Clinical outcomes of severe malnutrition in a high tuberculosis and HIV setting", *Archives of Disease in Childhood*, vol. 96, no. 6, pp. 560-564 5p.
7. European Collaborative Study, Boer K, England K, Godfried MH, Thorne C. 2010, "Mode of delivery in HIV-infected pregnant women and prevention of mother-to-child transmission: changing practices in Western Europe", *HIV Medicine*, vol. 11, no. 6, pp. 368-378 11p.
8. Fa'tima Rejane Lemos Patricio, George Williams Rutherford, Jose' Henrique Silva Barreto, Cynthia Rodamilans, Roberto Badaro .2015, "Effectiveness of the prevention of mother-to-child HIV transmission in Bahia, Brazil", *The Brazilian Journal of Infectious Diseases*, 2015;19(5): 538-542

9. Fisseha Wudineh and Bereket Damtew. 2016, "Mother-to-Child Transmission of HIV Infection and Its Determinants among Exposed Infants on Care and Follow-Up in Dire Dawa City, Eastern Ethiopia", *AIDS Research and Treatment*, Volume 2016 (2016), Article ID 3262746, 6 pages
10. Graham SM, Holte SE, Peshu NM, Richardson BA, Panteleeff DD, Jaoko WG, et al. 2007 "In Initiation of antiretroviral therapy leads to a rapid decline in cervical and vaginal HIV-1 shedding". *AIDS* 2007;21:501 – 7.
11. Geoffrey Fatti, Najma Shaikh, Brian Eley&Ashraf Gimwood. 2016, "Effectiveness of community-based support for pregnant women living with HIV: a cohort study in South Africa", *AIDS Care*, DOI: 10.1080/09540121.2016.1148112
12. Gupta, A., Bhosale, R., Kinikar, A., Gupte, N., Bharadwaj, R., Kagal, A., Joshi, S., Khandekar, M., Karmarkar, A., Kulkarni, V., Sastry, J., Mave, V., Suryavanshi, N., Thakar, M., Kulkarni, S., Tripathy, S., Sambarey, P., Patil, S., Paranjape, R. & Bollinger, R.C. 2011, "Maternal tuberculosis: a risk factor for mother-to-child transmission of human immunodeficiency virus", *Journal of Infectious Diseases*, vol. 203, no. 3, pp. 358-363 6p.
13. Hammer, S.M., Eron, J., Jr, Reiss, P., Schooley, R.T., Thompson, M.A., Walmsley, S., Cahn, P., Fischl, M.A., Gatell, J.M., Hirsch, M.S., Jacobsen, D.M., Montaner, J.S., Richman, D.D., Yeni, P.G. & Volberding, P.A. 2008, "Antiretroviral treatment of adult HIV infection: 2008 recommendations of the International AIDS Society-USA panel", *JAMA: Journal of the American Medical Association*, vol. 300, no. 5, pp. 555-570 16p.
14. John, G.C., Nduati, R.W., Mbori-Ngacha, D.A., Richardson, B.A., Panteleeff, D., Mwatha, A., Overbaugh, J., Bwayo, J., Ndinya-Achola, J.O. & Dreiss, J.K. 2001, "Correlates of mother-to-child human immunodeficiency virus type 1 (HIV-1) transmission: association with maternal plasma HIV-1 RNA load, genital HIV-1 DNA shedding, and breast infections", *Journal of Infectious Diseases*, vol. 183, no. 2, pp. 206-212 7p.
15. Jourdain, G., Mary, J., Coeur, S.L., Ngo-Giang-Huong, N., Yuthavisuthi, P., Limtrakul, A., Traisanthit, P., McIntosh, K. & Lallemand, M. 2007, "Risk

- factors for in utero or intrapartum mother-to-child transmission of human immunodeficiency virus type 1 in Thailand", *Journal of Infectious Diseases*, vol. 196, no. 11, pp. 1629-1636 8p.
16. Karen M. Hampanda (2016) Intimate partner violence and HIV –positive women’s non adherence to antiretroviral medication for the purpose of prevention of mother-to child transmission in Lusaka, Zambia, *Social Science & Medicine* 153 (2016) 123-130.
 17. Kouanda, S., Tougri, H., Cisse, M., Simpore, J., Pietra, V., Doulougou, B., Ouedraogo, G., Ouedraogo, C.M., Soudre, R. & Sondo, B. 2010, "Impact of maternal HAART on the prevention of mother-to-child transmission of HIV: results of an 18-month follow-up study in Ouagadougou, Burkina Faso", *AIDS Care*, vol. 22, no. 7, pp. 843-850 8p.
 18. Koima, W., Kimani, H. & Mwaniki, P. 2014, "Adherence to exclusive breastfeeding among HIV-positive women in Nairobi, Kenya", *African Journal of Midwifery & Women's Health*, vol. 8, no. 2, pp. 66-72 7p.
 19. Kuhn, L., Steketee, R.W., Weedon, J., Abrams, E.J., Lambert, G., Bamji, M., Schoenbaum, E., Farley, J., Nesheim, S.R., Palumbo, P., Simonds, R.J. & Thea, D.M. 1999, "Distinct Risk Factors for Intrauterine and Intrapartum Human Immunodeficiency Virus Transmission and Consequences for Disease Progression in Infected Children", *The Journal of Infectious Diseases*, vol. 179, no. 1, pp. 52-58.
 20. Lala, M.M. & Merchant, R.H. 2010, "Vertical Transmission of HIV-An Update", *Indian journal of pediatrics*, vol. 77, no. 11, pp. 1270-1276 7p.
 21. Landesman, S.H., Kalish, L.A., Burns, D.N., Minkoff, H., Fox, H.E., Zorrilla, C., Garcia, P., Fowler, M.G., Mofenson, L. & Tuomala, R. 1996, "Obstetrical factors and the transmission of human immunodeficiency virus type 1 from mother to child", *New England Journal of Medicine*, vol. 334, no. 25, pp. 1617-1623 7p.
 22. Lee, M.J., Hallmark, R.J., Frenkel, L.M. & Del Priore, G. 1998, "Maternal syphilis and vertical perinatal transmission of human immunodeficiency virus type-1 infection", *International Journal of Gynaecology and Obstetrics*, vol. 63, no. 3, pp. 247-52.

23. Lynn Rew. 2010, The systematic review of literature: Synthesizing evidence for practice, *Journal of Specialists in Pediatric Nursing*, DOI: 10.1111/j. 1744-6155.2010.00270.x
24. Magder, L.S., Mofenson, L., Paul, M.E., Zorrilla, C.D., Blattner, W.A., Tuomala, R.E., LaRussa, P., Landesman, S. & Rich, K.C. 2005, "Risk Factors for In Utero and Intrapartum Transmission of HIV", *Journal of Acquired Immune Deficiency Syndromes*, vol. 38, no. 1, pp. 87-95.
25. Milligan, C. & Overbaugh, J. 2014, "The role of cell-associated virus in mother-to-child HIV transmission", *Journal of Infectious Diseases*, vol. 210, pp. S631-40 1p.
26. Maccarthy, S., Rasanathan, J.J.K., Nunn, A. & Dourado, I. 2013, "I did not feel like a mother': The success and remaining challenges to exclusive formula feeding among HIV-positive women in Brazil", *AIDS Care*, vol. 25, no. 6, pp. 726-731 6p.
27. Marelign Tilahun and Shikur Mohamed. 2015, "Male Partners' Involvement in the prevention of Mother-To-Child Transmission of HIV and Associated factors in Arba Minch Town and Arba Minch Zuria Woreda, Southern Ethiopia", *Hindawi Publishing Corporation, BioMed Research International*, Volume 2015, Article ID 763876, 6 pages
28. Mmeje et al. 2016 "Achieving Pregnancy Safely in HIV-Affected Individuals and Couples: An Important Strategy to Eliminate HIV Transmission From Mother-To-Child and Between Sexual Partners", *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 1 December 2015, Vol. 70-Issue 4: p e155-e159
29. Navéér, L., Albert, J., Belfrage, E., Flamholc, L., Gissléén, M., Gyllensten, K., Josephson, F., Karlström, O., Lindgren, S., Pettersson, K., Svedhem, V., Sönnnerborg, A., Westling, K. & Yilmaz, A. 2011, "Prophylaxis and treatment of HIV-1 infection in pregnancy: Swedish Recommendations 2010", *Scandinavian Journal of Infectious Diseases*, vol. 43, no. 6, pp. 411-423 13p
30. Pat A. Tookey, Claire Thorne, Jean van Wyk and Micheal Norton. 2016 "Maternal and foetal outcomes among 4118 women with HIV infection

treated with lopinavir/ritonavir during pregnancy: analysis of population-based surveillance data from the national study of HIV in pregnancy and childhood in the United Kingdom and Ireland”, *BMC infectious Diseases* (2016) 16:65, DOI 10.1186/s 12879-016-1400-y

31. Pelletier, D.L., Jr, F.E. & Habicht, J. 1993, "Epidemiologic evidence for a potentiating effect of malnutrition on child mortality", *American Journal of Public Health*, vol. 83, no. 8, pp. 1130-1133 4p.
32. Polit, D.F. & Beck, C.T. 2012, *Nursing research : generating and assessing evidence for nursing practice*, 9. ed. edn, Wolters Kluwer Health/Lippincott Williams & Wilkins, Philadelphia.
33. Sandra I McCoy et al. 2015 “Food Insecurity is a barrier to prevention of mother to child HIV transmission services in Zimbabwe: a cross-sectional study”, *BMC Public Health* 2015 15:420 DOI: 10.1186/S12889-015-1764-8
34. Sheree R. Schwartz, Newton Kumwenda, Johnstone Kumwenda, Shu Chen, Lynne M. Mofenson, Allan W. Taylor, Mary Glenn Fowler, Taha E. Taha, 2016, “Maternal Highly Active Antiretroviral Therapy and Child HIV-Free Survival in Malawi, 2004-2009” *Matern Child Health J*, DOI: 10.1007/s10995-015-1852-5
35. Solomon Abteu, Worku Awoke and Anemaw Asrat. 2015 “Hiv Testing As An Intervention For Prevention Of Mother To Child Transmission Of Hiv And Associated Factors Among Pregnant Women Attending At Public Health Facilities In Assossa Town, Northwest Ethiopia”, *BMC Res Notes* (2015) 8:661, DOI 10.1186/S13104-015-1652-4
36. Sperling, R.S., Shapiro, D.E., Coombs, R.W., Todd, J.A., Herman, S.A., McSherry, G.D., O'Sullivan, M.J., Van Dyke, R.B., Jimenez, E., Rouzioux, C., Flynn, P.M. & Sullivan, J.L. 1996, "Maternal viral load, zidovudine treatment, and the risk of transmission of human immunodeficiency virus type 1 from mother to infant", *New England Journal of Medicine*, vol. 335, no. 22, pp. 1621-1629 9p.

37. Usman Aishat and Ayinde Olubunmi. 2016, "Prevention of Mother-to-Child Transmission of HIV/AIDS: Perception of Health care workers in rural Areas of Oyo State". *Hindawi Publishing Corporation, Scientifia*, Volume 2016, Article ID 4257180, 5 pages
38. Van Dyke, R.B., Korber, B.T., Popek, E., Macken, C., Widmayer, S.M., Bardeguet, A., Hanson, I.C., Wiznia, A., Luzuriaga, K., Viscarello, R.R. & Wolinsky, S. 1999, "The Ariel Project: a prospective cohort study of maternal-child transmission of human immunodeficiency virus type 1 in the era of maternal antiretroviral therapy [corrected] [published erratum appears in J INFECT DIS 1999 Mar; 179(3): 754]", *Journal of Infectious Diseases*, vol. 179, no. 2, pp. 319-328 10p.
39. Weinberg, G.A. 2000, "The dilemma of postnatal mother-to-child transmission of HIV: to breastfeed or not?", *Birth: Issues in Perinatal Care*, vol. 27, no. 3, pp. 199-205 7p
40. Namukwaya Z, Barlow-Mosha L, Mudiope P, Kekitiinwa A, Matovu JN, Musinye E, Ssebaggala JN, Nakyanzi T, Abwooli JJ, Mirembe D, Etima J, Bitarakwate E, Fowler MG, Musoke PM. 2015, "Use of peers, community lay persons and Village health team (VHT) members improves six-week postnatal clinic (PNC) follow-up and early infant HIV diagnosis (EID) in urban and rural health units in Uganda: a one year implementation study", *BMC Health Service Research* (2015) 15: 555 DOI 10.1186/s12913-015-1213-5->full name
41. Zelalem T. Haile, Asli K. Teweldeberhan & Ilana R.A. Chertok. 2016, "Correlates of women's knowledge of mother-to-child transmission of HIV and its prevention in Tanzania: a population-based study", *AIDS Care*, 28:1, 70-78, DOI: 10.1080/09540121.2015.1062465

Internet sources

42. WHO guidelines (2015) Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV-assessed on 27.4.2016

http://apps.who.int/iris/bitstream/10665/186275/1/9789241509565_eng.pdf

43. The World Bank 2015, 10/04/2015-last update, *The World bank Forecasts Global Poverty to Fall Below 10 per cent for First time; Major Hurdles Remain in Goal to End Poverty by 2030*-assessed on 11.3.2016
<http://www.worldbank.org/en/news/press-release/2015/10/04/world-bank-forecasts-global-poverty-to-fall-below-10-for-first-time-major-hurdles-remain-in-goal-to-end-poverty-by-2030>
44. UNDP 2015, *Human Development Reports*- assessed on 11.3.2016
<http://hdr.undp.org/en/humandev>
45. World Health Organisation 2016, *HIV/AIDS*-assessed on 11.3.2016
<http://www.who.int/hiv/about/hiv/en/>
46. World Health Organisation. 2010. *Guidelines on HIV and infant feeding 2010 Principles and recommendations for infant feeding in the context of HIV and a summary of evidence* – assessed on 25.1.2016
http://www.who.int/maternal_child_adolescent/documents/9789241599535/en/
47. HIV and AIDS statistics - <http://hivtukikeskus.fi/en/hiv-and-aids-statistics>, assessed on 17.2.2016
48. WHO 2014 http://www.who.int/topics/hiv_aids/en, assessed on 17.2.2016
49. UNAIDS-assessed on 4.3.2016 <http://www.unaids.org/en/resources/campaigns/HowAIDSchangedeverything/factsheet>
50. World Health Organisation- assessed on 27.4.2016
<http://www.who.int/mediacentre/factsheets/fs360/en/>

APPENDICES

Table 1: Database search results

Database	Search terms	Limiters	Results	Selected by the title	Selected by abstract	Selected by whole text
Cinahl complete	HIV prevention	-English language -2005 – Present -Full text	4334			
	HIV prevention AND Mother to child	-English language -2005 – Present -Full text	209	22	15	9
PubMed	HIV prevention	English language- 2005- present	65594			
	HIV prevention AND Mother to child	English language -2005- present	3568	25	7	7

Table 2: Summary of research articles

Title	Author, place and year of publication	The purpose of the study	The sample	Data collection methods	The main findings	Limitations
Maternal Highly Active Antiretroviral Therapy and Child HIV- Free Survival in Malawi, 2004-2009	Sheree R. Schwartz et al. 2015	Assessing the impact of maternal HAART in improving HIV related infant outcomes	n= 3022	Secondary analysis of data	Among HIV-exposed, uninfected infants, breastfeeding, but not HAART, was significantly associated with decreased child mobility	Women were initiated on HAART at local clinics and not through study services, the study was only able to ascertain whether women were currently on HAART and not the exact date of HAART initiation there also may have been important unmeasured confounders
Prevention of Perinatal Transmission of Human Immunodeficiency Virus	Catherine A. Chappell & Susan E. Cohn 2014	To find out the current prevention methods of PMTCT of HIV as a preconception care for HIV infected women		Systematic review	Preconception care is performed as part of the medical care	The study just summarise those current methods that are using to prevent MTCT of HIV

"I did not feel like a mother": The success and remaining challenges to exclusive formula feeding among HIV-positive women in Brazil	MarCarthy et al. 2013, Brazil		30 HIV infected women	Interviews	Mothers are likely to comply with national guidelines on breastfeeding their infants. However they are faced with challenges which could be tackled in postpartum counselling.	
Breastfeeding and the HIV transmission	Hayley Wright, 2004, Manchester, UK.	To provide an evidenced based plan of action to for HIV mothers to help prevent risk of HIV transmission through breastfeeding		Systematic review	The study showed that exclusive breastfeeding coupled with the use of antiretroviral therapy as well as the prevention of mastitis and abrupt weaning can help reduce HIV transmission.	Sample size is unknown, results can't therefore be generalized.
Adherence to exclusive breastfeeding among HIV-	Winneie Kolma et al, 2014, Kenya	To find the relationship between HIV breastfeeding	188 HIV positive mothers with	Descriptive cross-sectional studies using quantitative	Mothers have who have a good knowledge of EBF had higher adherence levels. Reasons resulting in non- adherence included demographic and socioeconomic factors such	There are common complications of breastfeeding that could be addressed in the study

positive women in Nairobi Kenya		mothers' knowledge of exclusive breastfeeding and its adherence.	children 6-12 months old. (n=188)	and qualitative approaches	as lack of a breadwinner, lack of food, breastfeeding complications such as mastitis and mothers limited knowledge on express milk for babies while they are away.	
Guidelines on HIV and Infant Feeding, 2010	WHO, Geneva – Switzerland, 2010.	Principles and recommendations for infant feeding in the context of HIV and a summary of evidence	n=47	Systematic literature review	HIV positive mothers to receive life-long ARV treatment. Breastfeeding exclusively for first 6 months, followed by breast and formula feeds for the next 6 months and gradual cessation of breastfeeding within 1 month. Maintenance of appropriate hygienic practices in preparation of baby's formula Heat treatment of expressed breast milk should mother's current situation not allow for breastfeeding	Some recommendations such as the breastfeeding and formula feeding during the second 6 months of life is based on low quality evidence
Prevention of mother to child transmission of HIV-1 through breastfeeding by treating infants prophylactically	Kilewo et al. Dar es Salaam. 2008.	To investigate the possibility of reducing mother-to-child transmission of HIV-1 by the prophylactic	n=398	Open-label, nonrandomized prospective cohort study	Resulting mother to child transmission rates were lower than comparative populations. The infants tolerated prophylactic ARV treatment during breastfeeding. This can be a useful strategy to prevent transmission.	Study was nonrandomized and hence a causal relationship cannot inarguably be established between treatment and results

with Lamivudine in Dar es Salaam		antiviral treatment of the infant during the breastfeeding period				
Early exclusive breastfeeding reduces the risk of HIV-1 transmission and increases HIV-free survival	Iliff et al, Harare - Zimbabwe, 2005	To measure the impact of a single dose vitamin A postpartum supplementation & to investigate the role of infant feeding practices in breastfeeding associated HIV transmission.	n=14110 mother and child pairs	Randomized studies	Exclusive breastfeeding was associated with lower risks of postnatal HIV transmission	Data was not collected on maternal blood viral load, frequency and quantity of non-breast milk foods consumed by infants. Feeding patterns were self-selected by mothers raising the possibility that mothers who chose EBF were originally at a lower risk of postnatal mother-to-child transmission.
Intimate partner violence and HIV-positive women's non-adherence to antiretroviral	Karen M. Hampana (2016) UK	To find out the relationship between intimate partner violence and non-	n=320	Quantitative method	Intimate partner violence is related to non-adherence of PMTCT during and after pregnancy, hence the awareness of intimate partner violence should be taken into consideration to eliminate HIV MTCT	This study has several limitations. First, it is cross-sectional and the causality of the timing of events cannot be established. There are bias in the results

medication for the purpose of prevention of mother –to-child transmission in Lusaka, Zambia		adherence to PMTCT				because they are based on self-reporting. In addition, the sample is small and non-representative, limiting the generalizability of findings outside of low socioeconomic populations in Lusaka.
Male partner's involvement in the prevention of Mother to child transmission of <u>Hiv</u> and associated factors in <u>Aeba</u> Minch Town and <u>Arba</u> Minch <u>Zuria</u> <u>Woreda</u> . Southern Ethiopia	<u>Maregn</u> <u>Tilahun</u> and <u>Shikur</u> Mohamed (2015)	To assess male partners involvement in prevention of mother-to-child transmission of HIV and associated factors in <u>Arba</u> Minch town and <u>Arba</u> Minch <u>Zuria</u> <u>woreda</u>	n= 720	Quantitative	Health facility should be accessible geographically and knowledge on PMTCT should be improved to increase male partners' involvement in PMTCT.	Causality cannot be deduced from these finding and self- report might have also introduced social desirability bias. The data based on self-declaration of men without women confirmation may limit the result on the evaluation of male involvement in PMTCT.

Prevention of Mother-to-child transmission of HIV/AIDS: Perception of Health Care workers in Rural Areas of Oyo State	<u>Usman</u> <u>Aishat</u> and <u>Ayinde</u> <u>Olubunmi</u> (2015)	To assess perceptions of health care workers in rural areas of PMTCT services in Oyo State	n=350	Quantitative	Despite poor knowledge of PMTCT of HIV/AIDS among the health care workers, the attitude toward PMTCT of HIV/AIDS was good.	Sample size is small
Use of peers, community lay persons and Village health team members improves six week postnatal clinic (PNC) follow-up and early infant HIV diagnosis (EID) in urban and rural health units in Uganda: A	<u>Zikulah</u> <u>Namukwaya</u> et al. (2015)	To evaluate the use of HIV infected peer mothers, community lay persons and village health team members to improve PNC follow up and EID in urban and rural health units	n=558	Quantitative	Use of peers, community lay persons and village health team member led to a significant increase in six week postnatal follow up of HIV infected women and EID among HIV exposed infants in the four study clinics	The reference data collected was incomplete for a few entries so it may lead to over-estimation of the finding. The intervention was primarily health unit peer focused.


one year implementation study						
Correlates of women's knowledge of mother-to-child transmission of HIV and its prevention in Tanzania: a population-based study	Zelalem T. HAILE , Asli K. Teweldeberhan & Ilana R.A. Chertok (2016)	To examine factors associated with having adequate knowledge of MTCT of HIV and PMTCT among a nationally representative sample of women in Tanzania	n= 10 299	Cross-sectional analysis	Among HIV positive women, those who experienced at least one pregnancy and having knowledge of HIV/AIDS were strongly associated with having adequate knowledge on MTCT and PMTCT of HIV	The main limitation is that, owing to the cross – sectional nature of the study, it is not possible to make causal inferences and determine the temporal nature of the associations. The study questionnaire's variables still need more variety. Self-reporting may contain biases.
Food insecurity is a barrier to prevention of mother-to-child HIV transmission services in Zimbabwe: a	Sandra I McCoy Email author, Raluca Buzdugan , Angela Mushavi , Agnes Mahomva , Frances M	To examine the association between FI and women's uptake of services to prevent mother-to-child HIV transmission	n=8790 women	Cross-sectional data collection	Among women with a recent birth, food insecurity is inversely associated with service utilization in the PMTCT cascade and severe household food insecurity may be positively associated with MTCT.	There are biases due to women self-reported receipt of healthcare service. Inferences about causation can't be made from cross-sectional data. Data are representative of the communities from which

cross-sectional study	Cowan and Nancy S Padian 2015	(MTCT) in Zimbabwe.				the sample was selected, they are not representative of all regions in Zimbabwe, It is possible that some mother-infant pairs were missed. It is possible that a small proportion may not have captured all possible samples' infections.
1 - Distinct Risk Factors for Intrauterine and Intrapartum Human Immunodeficiency Virus Transmission and Consequences for Disease Progression in Infected Children	Kuhn,L. ; Steketee,R.W. ; Weedon,J. ; Abrams,E.J. ; Lambert,G. ; Bamji,M. ; Schoenbaum,E. ; Farley,J. ; Nesheim,S.R. ; Palumbo,P. ; Simonds,R.J. ; Thea,D.M. USA 1999	To test whether timing of infection as tested from viral cultures affects disease progress independently maternal and perinatal characteristics	n=432	HIV infected mothers who had had live births were recruited from clinics across the US. Pre- and postpartum interviews and maternal laboratory tests were used	Babies infected with the HIV virus within the within first 2 days of live had a twofold risk of having the disease progress to AIDS and death	No mention of adjustments for sociocultural and economic factors which might affect quality of life outcomes

		during pregnancy and whose babies receive antiretroviral drugs after birth.				
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2 – Risk Factors for In Utero and Intrapartum transmission of HIV	Magder,L.S.; Mofenson,L.; Paul ,M.E.; Zorrilla,C .D.; Blattner,W. A.; Tuomala,R. E.; LaRussa,P.;L andesman,S.; Ri ch,K.C. USA 2005	Undertaken to identify factors that predict in- utero and intrapartum HIV transmission between 1990 and 2000	n=1709	Medical history, laboratory tests, and medical and obstetrical evaluations during pregnancy and deliver.	In-utero transmission strongly associated with hard drug use, maternal viral load, antiretroviral treatment and low birth weight	Researchers could not different between children infected in-utero and those infected during delivery. Knowledge and skill of delivery unit staff were not taken into account.
Maternal HIV-1 DNA load and mother-to-child transmission	3 - Arvold,N.D. ; Ngo-Giang-Huong,N. ; McIntosh,K. ; Suraseranivong,V. ; Warachit,B. ; Piyaworawong,S. ; Changchit,T. ; Lallemant,M. ; Jourdain,G. Thailand 2007	To determine if HIV-1 viral load was independently associate with mother to child transmission in a population of HIV positive mothers who received antiretroviral prophylaxis	n=66	Random selection of samples from a base of 1373 subjects based on the availability of sufficient quantity of store blood for analysis and an RNA viral load match.	It was found that DNA viral load had a stronger direct correlation with the risk of mother to child transmission than RNA viral load and that increase DNA viral load increases the risk for mother to child transmission.	Blood samples used were drawn up to 2 months postpartum and although DNA viral loads are pretty stable, RNA viral loads do vary and thus reducing the strength of associations which can be drawn regarding perinatal transmission

Table 3: Thesis commission form



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APPENDIX: THESIS PLAN

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Table 4: Recommendation for antiretroviral (ARV) regimens for the prevention of MTCT of HIV-1 (WHO 2010)

(a) ARV MTCT prophylaxis options when the pregnant woman is eligible for therapy*

Mother	Infant
<ul style="list-style-type: none"> • AZT + 3TC + NVP or • AZT + 3TC + EFV or • TDF + XTC + NVP or • TDF + XTC + EFV <p>(note: XTC = 3TC or FTC)</p> <p>Strong recommendation</p>	<p>Breastfeeding population</p> <ul style="list-style-type: none"> • Daily NVP from birth to 6 weeks <p>Non-breastfeeding population</p> <ul style="list-style-type: none"> • AZT for 6 weeks OR • NVP for 6 weeks <p>Strong recommendation</p>

*Eligible for therapy are women with CD4+ T cells ≤ 350 per mm^3 regardless of clinical stage, or with clinical stage 3 or 4 (symptomatic) regardless of CD4. Antiretroviral therapy should be started as soon as feasible regardless of gestational age

(b) ARV MTCT prophylaxis options when the pregnant woman is not in need of therapy

Option A	Option B
<p>Mother</p> <ul style="list-style-type: none"> • Antepartum AZT (from 14 weeks) • sd-NVP at onset of labour* • AZT + 3TC during labour & delivery* • AZT + 3TC for 7 days postpartum* <p>Infant</p> <p>Breastfeeding population</p> <ul style="list-style-type: none"> • Daily NVP (from birth until 1 week after all exposure to breast milk had ended) <p>Non-breastfeeding population</p> <ul style="list-style-type: none"> • AZT for 6 weeks OR • NVP for 6 weeks 	<p>Mother</p> <ul style="list-style-type: none"> • Triple ARV (from 14 weeks until 1 week after all exposure to breast milk has ended) • AZT + 3TC + LPV-r • AZT + 3TC + ABC • AZT + 3TC + EFV • TDF + XTC + EFV <p>Infant</p> <p>Breastfeeding population</p> <ul style="list-style-type: none"> • Daily NVP from birth to 6 weeks <p>Non-breastfeeding population</p> <ul style="list-style-type: none"> • AZT for 6 weeks OR • NVP for 6 weeks

*sd-NVP and AZT + 3TC can be omitted if mother receives >4 weeks AZT antepartum

3TC	Lamivudine, Epivir	NVP	Nevirapine
AZT	Azidothymidine	TDF	Tenofovir Disoproxil Fumarate
EFV	Efavirenz		
FTC	Emtricitabine, Emtriva		
LPV	Lopinavir		