# PREVENTION OF MOTHER-TO –CHILD TRANSMISSION (PMTCT) OF HIV IN AFRICA

Senior Seminar

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# Abstract:

While analyzing the current state of preventing the mother-to-child transmission of HIV, I have found a variety of treatments and preventable medicines. These options are available for HIV positive and those who face a high risk of acquiring HIV.

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# Introduction

The Human immunodeficiency virus (HIV) and the acquired immune deficiency syndrome (AIDS) are worldwide pandemics. In 2015, the United States Agency for International Development (UNAIDS) estimated around 36.7 million individuals internationally, living with HIV/AIDS. With Africa having the most serious epidemic the virus in the world. Roughly 150,000 children were infected by their HIV-positive mothers in 2015, most of which reside in the southern portion of Africa. Pregnancy, childbirth or breastfeeding were the main modes of mother-to-child transmission [1]. Research has proven that early virologic testing, to detect and treat the virus in a HIV positive pregnant female can reduce the child’s (younger than 10 years old) risk of HIV in half. Early treatment with antenatal care (ANC) and antiretroviral (ART/ARV) prophylaxis can prove beneficial for the preservation of the child’s health through and after birth along with slowing the disease's progression and prevent secondary infections [2].

 The Acquired immunodeficiency syndrome (AIDS) is a more serve disease caused by HIV which can be contracted person-to person. Transmission routes of HIV to a healthy individual include: contact with infected blood, semen, vaginal fluids, serum, and breastmilk. Flu- like symptoms appear within the first week of infection along with extreme exhaustion. The next stage in the disease is typically non-symptomatic until HIV advances into AIDS. With AIDS, the patient experiences major weight loss, an abnormally high body temperature, fatigue, and frequent infections and eventually death [3]. There is no cure for AIDS, but the World Health Organization (WHO) has recommended many preventative and treatment regimens for PMTCT of HIV we can an optimistic outlook in the disease possibly becoming extinct because if we can eliminate HIV/AIDS from continuously infecting the youth the disease will fade out completely [1].

Current treatment for HIV positive pregnant women include lifelong ART despite their CD4 count during diagnosis nor the clinical stage of the mother. This plan includes a strict regimen of treatment after delivery and completion of breastfeeding for life. When HIV positive pregnant females either have no knowledge of their HIV status or feel as though they do not need ARVs for other purposes, this poses a threat to the health of the child and it provides the disease a chance to spread [4].

# Research Background

United States Agency for International Development (UNAIDS) calculated, roughly 19 million (17.7–20.5 million) individuals residing in Eastern and Southern Africa were living with the Human immunodeficiency virus (HIV). Likewise, these same studies also show a decline of 14% in the number of new cases of HIV in East and South portion of Africa. In the past years, between 2010 and 2015, cases of infection have since dropped by 14% in Eastern and South Africa (ESA). The number of HIV related deaths also declined by 38% between these years. Of 10.3 million people in ESA who were diagnosed with HIV had access to adequate antiretroviral therapy (ART), and in the past 7 years the new cases of HIV infection among children has seen a 66% plunge, compared to older ESA HIV statistics [5]. In 2008, there were about 350,000 incidents of the mother-to-child transmission (MTCT) of HIV. Whereas the lower income and middle income nations, showed the highest prevalence of MTCT HIV cases in 2008 especially in the Sub-Saharan portion of Africa which contributed to more than 90 % of infections. Since these studies, there has been an intervention and upgrade within Africa’s primary antenatal care (ANC) system for the mother and child [6].

As of 2013, there are three options available for HIV positive pregnant females: Option A, Option B, and the newest Option B+. These options provide ARV treatment for both the mother-to-child during birth and breastfeeding and improvements to these preventative plans can lead to complete eradication of MTCT of HIV, especially in Africa where HIV remains to be a pandemic. PMTCT programs in Sub-Saharan hospitals need to be more effective with reaching out to all pregnant high risk of HIV mothers, regardless of shortage of staffing and accessibility, lack of partner support, funding and overcome cultural stigmas on the national level. Research to further understand the social impact of HIV and the impact it has on treatment of the patient is also being accessed. Outreach to all pregnant mothers in this region of the world along with virological testing can change the future [7].

According to the WHO guidelines released in April 2012, Option A supplies treatment to avert the transmission of the virus from a HIV positive (with a CD4 count of ≤350 cells/$mm^{3}$) mother to a susceptible fetus. With this option the patient receives triple ARVs initially as soon as HIV is detected, and sustained for the rest of their life. Triple ARVs - Antepartum (AZT): which a patient starts during the 14 weeks gestation period. Intrapartum: which is administered to the mother at onset of labor, sdNVP and the initial dose of AZT/3TC. Postpartum: which is taken every day AZT/3TC over a period of 7 days postpartum by the HIV positive mother. Included with Option A is the treatment of the infant, initially the infant will receive a daily dosage of NVP from delivery through to their first week beyond the complete termination of breastfeeding. If the baby receives similac (baby formula) or the mother is on treatment, through 4–6 weeks old. Option B treats HIV by giving the HIV positive pregnant mother Triple ARVs should begin onset of diagnosis, and this is a lifelong treatment regimen. Triple ARVs begin as soon as 14 weeks after HIV development, and continuous administered through intrapartum and through delivery if not breastfeeding or until a week after the mother ends breastfeeding, with Option B. Lastly, babies of mothers who received Option B for HIV receive NVP or AZT every day from birth through 4–6 weeks of age regardless of infant being breastfed or receiving formula. Option B+ on the other hand, recommends triple ARVs start immediately after the mother is diagnosed, and it is suggested to be continued for life. With option B+ infants also receive a daily dosage of NVP or AZT from birth through age 4–6 weeks despite the infant being breastfed or receiving formula, which is also recommended with Option B [8].

 Despite a worldwide increase in the efforts and improvements being made to prevent the mother-to-child transmissions (MTCT) of HIV, many believe that MTCT of HIV is even more avoidable through different channels of interventions. Mainly, the issue seems to rely mostly on the primary care system for parental/ maternal and child health. The United Nations (UN) has categorized a list of interventions in hopes to stop MTCT of HIV - (1) to initiate the principal prevention of the HIV contagion among ladies around the childbearing ages; (2) preventing unintended pregnancies among women living with HIV through educating the community about the practices of safe sex; (3) averting HIV transmission from women infected and living with HIV to their newborns; and (4) providing the suitable treatment, care and support to mothers living with HIV, their children and families. The World Health Organization (WHO) has emphasized the third guideline, in the list mentioned above, which recommends lifelong dosing of ART and treatment to HIV positive women. In addition to that treatment, WHO has suggested two extra alternatives of extremely effective prophylaxis, ideally to assist HIV positive pregnant female patients who are not require ART for as much as other HIV patients. These ideas posed by WHO, have been successful in lowering the rate of new MTCT cases to about 2 % in countries with the adequate health care accessible [9].

World Health Organization printed the earliest guidelines/strategies on the use of ARVs, in 2013 for treatment and prevention of HIV for the world. This revision to the previous ARV guidelines are derived from new and innovative scientific experiments and ideas implemented in 2015. According to the WHO, the virus flourishes in populations where individuals may face more than one factor that can lead to HIV contraction. In these retroviral hotspot areas, like Africa, the people are not only vulnerable to HIV but they also encounter many barricades in HIV prevention and treatment. The high-risk populations for HIV, from the words of the WHO include - (1) homosexual men, (2) drug addicted individuals who use syringes to inject substances, (3) people in prisons and barred settings, (4) prostitutes and (5) transgender people [10].

Since 2015, the WHO has made two main changes to the new guidelines. Primarily, antiretroviral therapy (ART) must be administered to every HIV positive individual no matter their CD4 (T-cell) cell count. This revision was due to the evidence of 2013 studies which presented that more aggressive and prior use of ART prove to be the best clinical procedures, compared to the delayed treatment in HIV positive individuals. Secondly, the HIV positive individual should be treated daily with the prescribed oral pre-exposure prophylaxis (PrEP). The oral prophylaxis is a useful aid for persons with in increased risk of HIV infection, to prevent the contraction of HIV in high risk populations before an infection happens. The second revision, according to clinical trial results in which confirmed the effectiveness of the ARV drug tenofovir as a PrEP to avoid the spreading of new cases of HIV infection [10].

These guidelines are being heavily pushed and being made available at the earliest after diagnosis, by the WHO, these methods of treatment have been projected to significantly lower the percentage of newly developed HIV infections HIV-related deaths on the global level of public health. In September 2015, the WHO, recommended ART be administered to every pregnant and breastfeeding HIV positive women, irrespective of the CD4 cell count. This treatment is highly suggested to be continued lifelong. The quality of the evidence related to this form of HIV treatment is moderate. In children diagnosed with HIV that are older than 1 years old but younger than 10 years old, the WHO recommends ART be administered to all HIV positive children regardless of their CD4 cell count. However this form of treatment is recommended by the WHO on special conditions, partially because there is little evidence to show the quality of improvement with this particular treatment. There is also a second option that is highly recommended for HIV positive children <2 years old. The treatment states that ART should be administered as a priority to all HIV positive <2 year olds, 1-10 year olds in the advanced stages of HIV/AIDS (WHO clinical stage 3 or 4) and persons with CD4 percentage of <25% (if < 5 years old) or CD4 count ≤350 cells/mm3 (if ≥ 5years old). Evidence of this form of treatment being beneficial is moderate according to WHO guidelines. In children less than one year old, WHO recommends ART should be initiated at any CD4 cell count. This is strongly recommended to be beneficial for children this age, with moderate clinical support available [11].

In 2016, WHO released a consolidated set of guidelines on HIV “prevention, diagnosis, treatment and care” for the betterment of high risk HIV populations in their battle against HIV. The guidelines approach HIV treatment and care, states that populations with a high rate of HIV infection must equal healthcare access to ART treatment and the equal help in ART supervision, despite the overall advancement of the nation. For every pregnant mother residing in one of the key populations (mentioned) must have equal right to use to primary health care services for PMTCT and adhere to the exact same recommendations as women in other populations.

Interventions made by the WHO to be conveyed by public health sectors includes: 1)An accurate and constant use of condoms with condom-safe lubricants is suggested for every HIV at risk person to avoid sexually contracting HIV and other sexually spread infections (STIs). 2) Oral PrEP medicines containing tenofovir disoproxil fumarate (TDF) must be offered as a supplementary prevention option for populations at a high risk of contracting HIV as. 3) Post-exposure prophylaxis (PEP) should be a readily attainable option to every eligible person within a high-risk population, after that individual has possibly been exposed to HIV. Lastly, 4) Voluntary medical male circumcision (VMMC) is suggested as a supplementary, vital approach aiming to eliminate male to female transmitted HIV in males, predominantly in situations with *hyperendemic* (a constantly high rate of HIV within all age groups equally), widespread HIV epidemics, and low prevalence of male circumcision [12].

Since 2015, when WHO campaigned to the world that the termination of the AIDS pandemic is reachable by expanding ART to all HIV positive individuals, there have been clear results of this theory. More recently in 2016, there were 18.2 million people living HIV positive and on ART worldwide. This is a huge flux compared to the past year in 2015, when only 15.8 million were using ART. In 2010, 7.5 million HIV positive patients were using ART, under a million people accessed ART in 2000, when the pandemic was at its peak. Innovative strategies must still increase as far as prevention, on a global scale. The sub-Saharan Africa the most HIV infected children resided in 2015, 150,000 children under the age of 15 years old, statistics from the WHO show this cases were caused by the MTCT of HIV. Cases of contraction mostly included perinatal transmission of HIV during delivery, labor, pregnancy, and breastfeeding. In November of 2016, WHO claimed Sub-Saharan Africa as having the highest rate of HIV worldwide, roughly 25.6 million people [13].

Findings and Significance of Future Direction

The onsite testing and detection of the presence or absence of HIV antibodies in the patient’s plasma is done by means of rapid diagnostic tests (RDTs). These tests are the quickest ways to detect the virus and treat HIV before it becomes too severe. In 2013, less than half of all HIV positive pregnant women living in middle/ low pay countries did not receive any HIV testing to detect the presence of HIV [10]. Without the necessary testing and detection of HIV 33% of children died before the age of one. Because of the early detection tests, now 70% of HIV positive pregnant women are also receiving ART. As of today, WHO records that 60% of HIV positive people know their HIV status [13]. The remaining 14 million people included in the statistic of not knowing their HIV positive status, have not sought out testing RTDs, for same day diagnosis and treatment. 18.2 million Individuals worldwide, in mid-2016, were receiving ART. These are the results of WHO’s Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infectionpublished in 2013 [10].

In 2016 the 69th World Health Assembly endorsed a response to the accomplishments of the 2013 guidelines. This document is a list of 5 tactile strategies to guide the actions of countries and WHO over the next six years. **Strategic direction 1)** –This portion is sub-labeled focus and accountability. The necessity to fully comprehend the wide-ranging effect of HIV and the reaction should be the foundation for advocacy, political commitment, national planning, resource mobilization and allocation, implementation, and program improvement. **Strategic direction 2)** – This section is sub-labeled vital interventions for impact. This strategy addresses universal health coverage, by describing the need medical of intervention that can be accessed throughout health services in each country and especially the global targets for HIV. This is being deliberated for inclusion in health benefit packages. **Strategic direction 3)** – This section is subtitled delivering for quality and equity. Strategic direction 3, discusses the second importance of sufficient universal health coverage by, classifying the best methods and approaches for providing a high-impact health intervention. The focus to provide the same value of health care to every patient, despite different populations residing in different locations. The goal is to equity and ensure quality in the health care sector to all patients. **Strategic direction 4** – This portion is subtitled financing for sustainability. Here the 69th World Health Assembly addresses the universal health coverage by creating sustainable and innovative models for financing and reducing costs of healthcare and treatment. People should be able to access the required healthcare services without experiencing financial debt. **Strategic direction 5** – Subtitled innovation for acceleration. Here we are made knowledgeable of the regions where there are breaches within the knowledge and technologies, compared to the healthcare global advances being made with HIV [14].

These innovation are projected to shift the HIV response so that the 2020 and 2030 targets can be achieved, but they can only be accomplished if every country is providing the same innovative approach to each patient within the healthcare system. UNAIDS has also released a “*On the fast track to end AIDS*” to aid in the goal of ending the HIV/AIDS epidemic by 2030. Together these guidelines outlines intervention areas identified for inclusion in the national benefit package or other means of public funding in order to: reduce the risk and susceptibility of HIV, reduce the transmission of HIV, improvement in HIV testing and treatment, and improvements in the care of chronic patients effected by the disease. UNAIDS has listed long term 2030 goal for the HIV/AIDS epidemic is both far-reaching and people oriented, therefore smaller target goals have been set to be accomplished by 2020 in order for the 2030 plan to be reached. The three goals that correspond to the 2020 target include: less than 500,000 individuals being newly infected with HIV. Less than 500,000 deaths due to AIDS. Lastly, the abolishment of HIV/AIDS based cognitive discrimination, especially in the healthcare sector [15]. Long term target goals to be accomplished by the end of 2020, according to the 69th World Health Organization, there should be a 75% drop in the number of new HIV infections in comparison to 2010. There should also be no newly reported cases of HIV infection among infants, due to the increased prevention in the mother- to- child transmission of HIV along with ART. A reduction in HIV related deaths, as mentioned in the 2020 goals of UNAIDS. Lastly, by 2020 there should be a noticeable increase, 90% of HIV/AIDS infected individuals receiving ART [14]. The 2030 Agenda proposed by UNAIDS, explains how complex it is to move forward with the disease with a collective global effort. Now the aims have been shifted from mainly the bigger and more economically sound countries to the poorer les opportune centuries. The Sustainable Development Goals (SDGs) outline in the 2016-2021 UNAIDS plan, mandates stakeholders to aid in the integration efforts. In the plan there is a figure that addresses what they believe are the causes of HIV, and in addressing the determinants of healthy living and susceptibility. Some of the items mentioned in the list of determinants include: the termination of poverty and hunger, ensuring healthy lives for everyone (PMTCT of HIV, acquiring HIV through sexual encounters), ensuring a quality education among all, achieving gender equality, promoting economic growth for all countries, reducing inequality (referring to the stigma that comes with being HIV positive in some populations), making cities safe, promoting peaceful and all-encompassing societies, and lastly strengthening the means of application of treatment. Each of the items mentioned above play a vital role in the in the prevalence of HIV [15].

Poverty increases the susceptibility of an HIV infection. Because of the unequal socioeconomic status of women within the community, there are less likely to prevent the contraction of HIV if they work sex workers. Households with someone who is HIV positive most often slide down the economic totem pole, in to poverty. Plans of economic empowerment and the social protection of abused women, can sustain health in HIV positive individuals. Hunger is also a possible cause of HIV, because it leads people to partake in high-risk behavior and contract the virus. Malnutrition can aid HIV in compromising the immune system and further advance the disease. In response to this, there are plans within the guideline to nutritionally support households and integrated systems, to ensure the health of everyone. Also listed a determinant by UNAIDS, the absence of a universally dependable healthcare, for both pregnant mothers and sexually active individuals, impairs the benefits of most HIV prevention and treatment tactics [16]. Many contracting HIV, are infected via sexual or the MTCT transmission of HIV. Once this issue can be resolved, we can expect, health equity, rights based services for sexually active people and pregnant mothers in health care, and the equal treatment of noncommunicable diseases. Worldwide, on average, 70% of women (15-24 years of age) have contracted HIV and have missed school because they are unaware of their HIV status. This speaks to the stigma within the community against HIV. People no longer seek the knowledge of their own HIV status because of the ostracism and negative stigma that comes along with the diagnosis. Therefore, a better sexual education class/course across the world or somehow integrated into the child’s learning can begin to prepare the youth to be more knowledgeable when it comes to sex and disease [14].

There are many common factors make women often seen inferior to the male gender, the gender inequality towards women varies in severity among countries. This leaves women, within the reproductive ages of 15-44 years old, prone to death due to HIV/AIDS. To resolve this issue USAIDS proposes Gender- transformative HIV program campaigns to involve more people from all over the world to help women fight sexual and reproductive health innovations. Insufficient safety measures and unhealthy working environments are another determinant of HIV, especially for prostitutes and migrant workers. Most HIV positive patients are also unemployed, supplying the accommodations needed for HIV positive employees can restore the finances needed for HIV therapies such as ART and prophylaxis. Which leads to the next topic of financial inequality. HIV seems to thrive in societies of low and middle income citizens, this may be because the healthcare within these communities are less effective and non-affordable compared to the healthcare and housing available in high income societies. The resolution posed to repair this issue is an enhancement of human rights to equal healthcare, with the support of legal services. Urban and city areas are mainly where most HIV cases are found. Because of the rapid growth of urban societies, the HIV epidemic is growing at almost the same rate. To suppress the growth of HIV among these areas, city-led AIDS response talks are being dispersed to support healthcare in these populations. Segregation, dishonor, and rage allow HIV to remain an epidemic in the world. The AIDS responses to the public are led by HIV positive people and the family members of HIV positive patients steer towards the rights of people that are HIV positive. These rights-based programs can lead to possible legal changes for HIV patients. The last determinant of HIV is the affordability of HIV treatment. Steps to make healthcare more affordable for these patients are underway, to benefit the masses of individuals with contagious diseases to able to afford proper healthcare [15].

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