Food and Public Health 2020, 10(2): 35-47
DOI: 10.5923/j.fph.20201002.01

Comparing the Prevalence of Maternal HIV in Resource Poor and Rich Settings

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Abstract Several studies indicate that HIV-infected women continue to have children. The main aim of this study is to determine the trend in HIV transmission at subsequent pregnancies, the factors responsible for the unequal prevalence of maternal HIV in both resource-rich and resource-poor settings and the 2016-2021 HIV reduction strategies proposed by WHO and the financial backing of these strategies. From the literatures reviewed, one of the results showed pregnant women who were enrolled in single dose nevirapine-base Prevention of Mother-to-Child Transmission of HIV (PMTCT) programme and the period they observed exclusive breastfeeding. At the subsequent pregnancy, HIV-infected children had a similar duration of exclusive breastfeeding periods (4.2 months [SD 2.6] versus 6.2 months [SD 3.3] for uninfected children, OR 0.76 [0.57–1.02]). At the initial pregnancy 37.5% of mothers did not receive single dose nevirapine transmitted versus 36.8% of those who did receive nevirapine (OR 1.12 [0.23–5.34]). For the subsequent pregnancy, the percentages were 22.2 and 10.2, respectively (OR 2.51 [0.43–13.37]). This result, statistically demonstrate no significance/correlation in the single dose nevirapine-base HIV PMTCT programme and the period of exclusive breastfeeding in averting vertical transmission in a resource-poor setting even with the advent of antiretroviral therapy and advancement in technology.

Keywords Prevalence of HIV, HIV risk factors, Maternal HIV complications, ARV regimen

1. Introduction

HIV is a virus spread through body fluids that attacks the body's immune system, specifically the CD4+ cells, often called T cells. These special cells help the immune system fight off infections. Untreated, HIV reduces the number of CD4+ cells in the body. This damage to the immune system makes it harder and harder for the body to fight off infections and some other diseases. Opportunistic infections or cancers take advantage of a very weak immune system and signal that the person has AIDS [1].

Globally, the number of people living with HIV is 37.9 million (32.7 million – 44.0 million), newly HIV infected persons in 2019 is 1.7 million (1.4 million - 2.3 million) and deaths due to AIDS in 2019 is 770 000 (570 000 – 1.1 million) [2].

The below map (Figure 1.1) indicates the global percentages of adult HIV prevalence (15-49 years), with the highest endemic region being Africa. (America, Europe, South-East Asia, Eastern Mediterranean and Western Pacific) have prevalence of 0.5% or less, which demonstrates a lower prevalence rate.

HIV/AIDS is the second leading cause of death for teens globally, and AIDS-related deaths among adolescents have tripled since 2000. AIDS is the number one cause of death among adolescents in Africa [3]. The two top causes of death in women of reproductive age globally are HIV and AIDS (19%) and complications related to childbearing (15%) [4]. Sub-Saharan Africa is the region with the highest maternal mortality rate globally (596 per 100,000 live births) and where half of maternal deaths occur [5]. In 2011, 90% of the total number of pregnant women with HIV lived in sub-Saharan Africa [6]. The region is home to 69% of the 34 million people living with HIV globally [7].

A recent analysis of mortality during pregnancy and the six week postpartum period found that women with HIV were eight times more likely to die than their HIV-negative counterparts and led the researchers to estimate that a quarter of deaths of pregnant and postpartum women in sub-Saharan Africa are attributable to HIV [8]. Given these findings, the 2012 resolution by the UN Commission on the Status of Women to eliminate preventable maternal mortality will not be achieved unless HIV among women of reproductive age is addressed and care of pregnant women living with HIV is improved [9]. Changing the negative synergies between HIV and poor maternal health outcomes into opportunities to promote the health and well-being of women of reproductive age, both those who are living with HIV and those who are not, is an urgent international public health priority.

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Published online at http://journal.sapub.org/fph

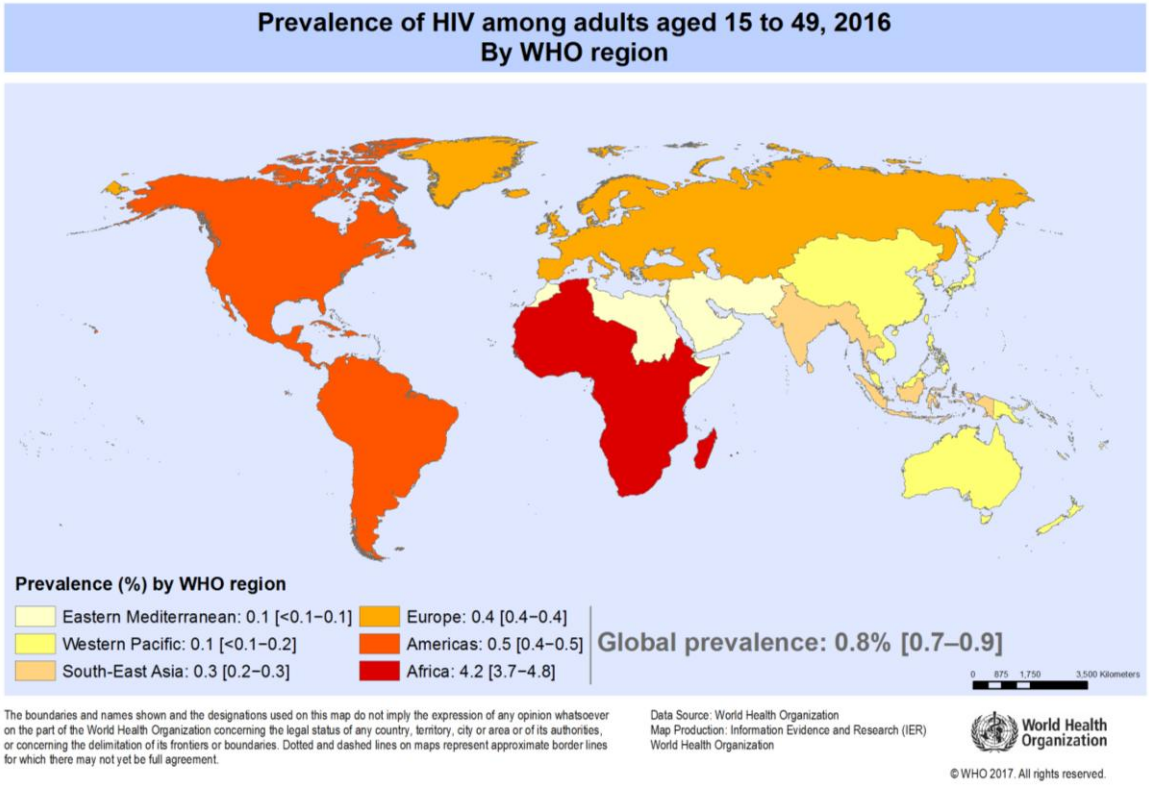
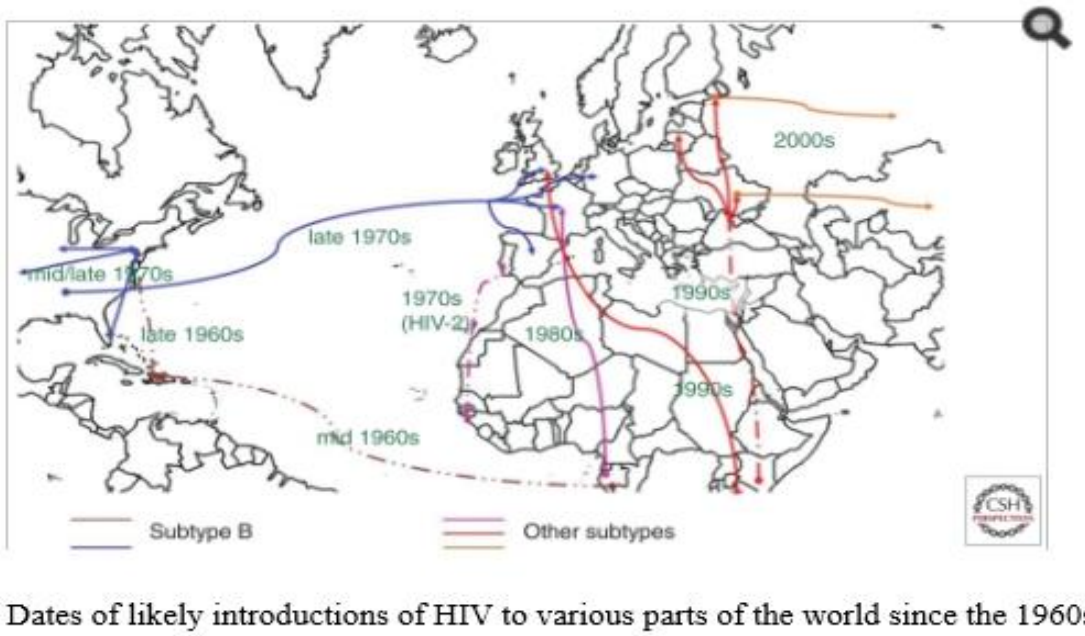


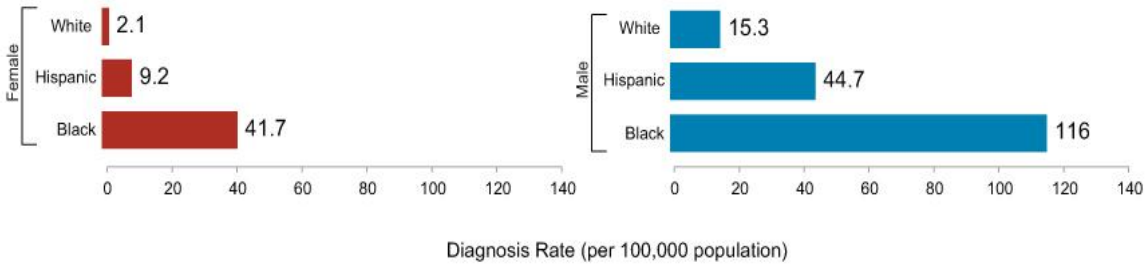
Figure 1.1. Adult global HIV prevalence



Dates of likely introductions of HIV to various parts of the world since the 1960s.

Figure 1.2. Phylogenetic analysis of HIV

Molecular phylogenetic approaches have established historical links between HIV strains from central Africa to those in the United States and thence to Europe. However, Europe did not just receive virus from the United States, as it was also imported from Africa directly. Initial introductions led to epidemics in different risk groups in Western Europe distinguished by viral clades/sequences, and likewise, more recent explosive epidemics linked to injection drug use in Eastern Europe are associated with specific strains. Molecular epidemiological evidence suggests strongly that since the 1960s, HIV-1 and HIV-2 have been transported from Africa to North America/Caribbean and Europe. Cases were recognized almost as early among individuals having links to Africa and these led to local epidemics of non-B clades [10].



Graph 1.1. Racial HIV prevalence in the US

HIV surveillance data from (graph 1.1) shows that the rates of new HIV infection are disproportionately highest within ethnic minority populations in the US. African-Americans in both sex account for a higher proportion of HIV infections than any other population at all stages of the disease from initial infection to death by 2014 [11].

HIV/AIDS RISK FACTORS

- Having unprotected vaginal, anal, or oral sex with someone who is infected with HIV.
- Having many sexual partners.
- Having sex with a sex worker or drug user.
- Sharing needles, syringes, or equipment used to prepare or inject drugs with someone who is HIV infected.
- Using needles for piercing or tattooing that are not sterile. (An accidental needle stick with a contaminated needle or medical instrument, however, is a very rare cause of HIV transmission.)
- Having another sexually transmitted disease (STD), such as herpes, syphilis, or gonorrhea. STDs may cause changes in tissue that make HIV transmission more likely.
- Having had a blood transfusion or received blood products.
- Having fewer copies of a gene that helps to fight HIV (C-C chemokine receptor type 5, also known as CCR5 or CD195) is a protein on the surface of white blood cells that is involved in the immune system as it acts as a receptor for chemokines [12].

HIV TESTING AND MATERNAL MORTALITY

In 2012, only 38% of pregnant women in low and middle income countries received HIV counseling and testing [13]. The risk of maternal mortality among HIV-infected women remains high in the 24 months following delivery, even among those with CD4+ counts as high as 1000 cells/μL [14].

There are a variety of different HIV test, but most widely used is the HIV antibody test, that look for the antibodies to HIV in the blood. The soonest an antibody test will detect infection is 3 weeks. Most (approximately 97%), but not all, people will develop detectable antibodies within 3 to 12 weeks (21 to 84 days) of infection [15].

It is estimated that, globally, about half of people living with HIV currently do not know their HIV status. However, at the end of 2018, an estimated 79% of people living with HIV knew their status. HIV testing also offers an opportunity, in parallel, to screen for other infections and health conditions, including sexually transmitted infections, tuberculosis and viral hepatitis, which is likely to contribute significantly to reducing comorbidity and mortality [16].

Maternal deaths among women with HIV are mostly attributed to indirect rather than obstetric causes, particularly non-pregnancy-related infections [17]. HIV/AIDS is the leading cause of death among children under the age of 5, with approximately 330.000 children presently living with HIV/AIDS in South Africa. In KwaZulu-Natal, region of the country, approximately 93,000 children under the age of 15 were living with HIV in 2014 [18].

Malaria and tuberculosis pose increased risk of morbidity and mortality in pregnancy and these risks are substantially increased when women are also living with HIV [19]. Research is needed to determine whether pregnancy has an independent effect on mortality among women living with HIV and how risk of morbidity and mortality interacts with immune parameters and time on ART.

The above map (Figure 1.3), shows regions of the world with the highest deaths due to AIDS to be Africa with 720,000 death, South-East Asia with 130,000 death, Europe with 49,000 death, America with 54,000 death, West Pacific with 39,000 death and East Mediterranean with 17,000 death by 2016, respectively.

PREVENTION OF MOTHER TO CHILD TRANSMISSION PROGRAMMES

The global coverage of prevention of mother-to-child transmission (PMTCT) services remains suboptimal with only 18% of all pregnant women in low-income and middle-income countries (20.6 million of 115 million pregnant women) estimated to have received an HIV test in 2007, though this had increased from estimates of 16% in 2006 and 10% in 2005 [20].

In industrialized settings, antiretroviral therapy (ART), with at least three potent antiretroviral (ARV) drugs is recommended to PMTCT of HIV; ART should be initiated, as soon as possible after the first trimester and stopped soon after delivery [21]. However, in the United States, short-course regimens of one or two ARVs are still an option for women with plasma viral load <1000 copies/mL, or for those who are screened for HIV late in pregnancy or during labor [22]. In resource-limited settings, ART is

recommended only in pregnant women with indication of treatment, while those who do not meet clinical and immunologic eligibility criteria for ART according to the WHO guideline should receive short-course ARV regimens [23].

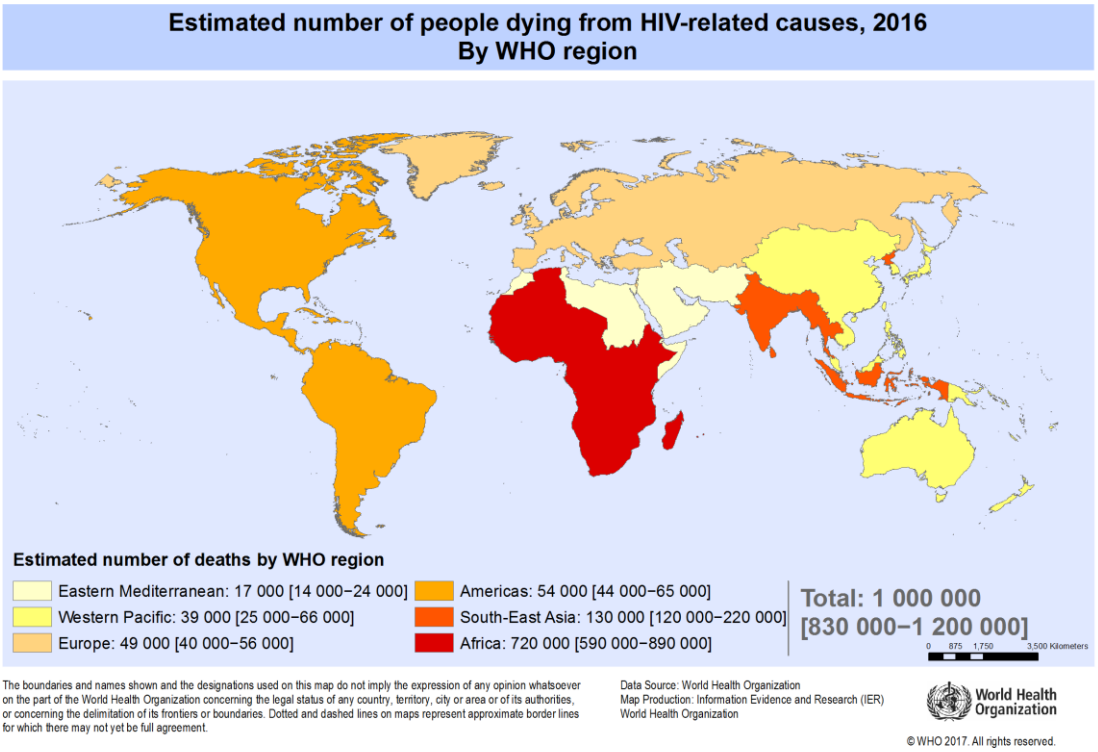


Figure 1.3. Adult and Child death to AIDS

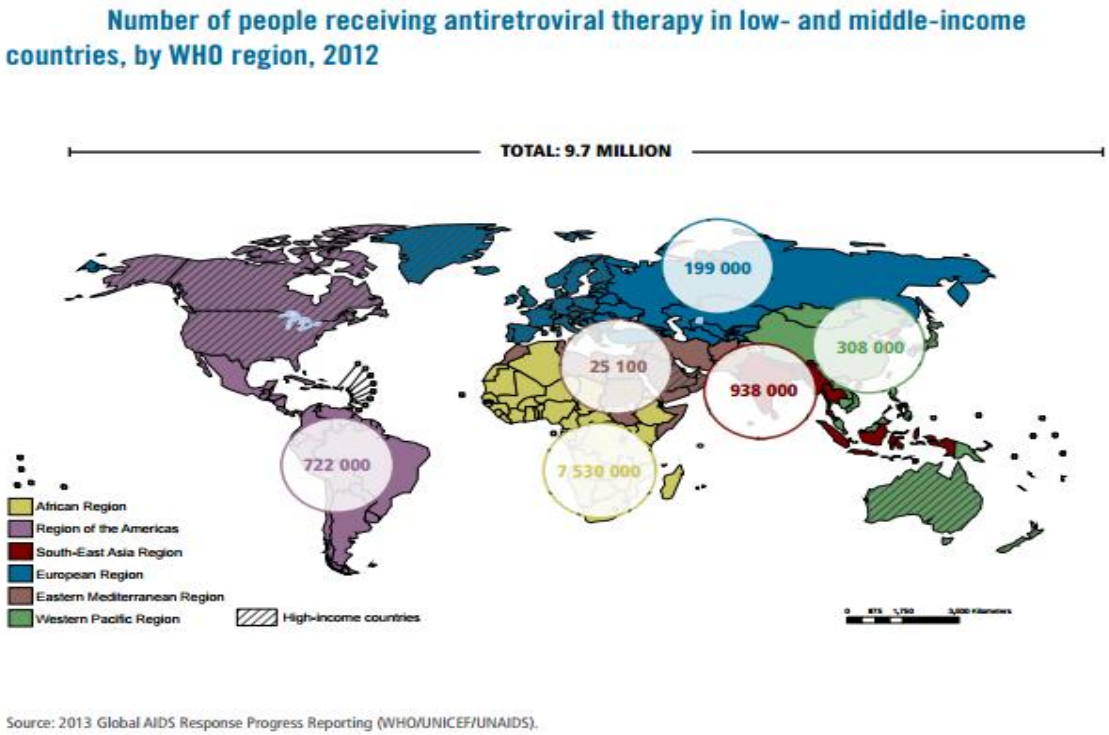


Figure 1.4. The world's population of ARV recipient

Prophylactic ARV PMTCT regimens reached only 10% of the HIV-infected pregnant women in 2006, ART programmes is critical for HIV-infected pregnant women in terms of PMTCT and subsequent ART response, HIV positive women were formerly offered single-dose nevirapine (sdNVP) only as first-line of ART. But the negative impact of this sdNVP exposure on subsequent first-line ART appears worse for mothers with HIV infection at the time of delivery. Due to the negative effect of nevirapine the initiation of combination antiretroviral therapy (CART) was introduced which led to a profound impact on mortality, averting 7.6 million deaths globally since 1995 [23].

The WHO currently recommends the administration of zidovudine (ZDV) initiation as soon as possible from the 28th week of gestation, together with sdNVP during labor and seven days of ZDV+lamivudine (3TC) postpartum [23]. The neonate should receive sdNVP and one week initiation of ZDV syrup.

The World Health Assembly has adopted a HIV strategy aimed to further scale-up the prevention and testing to reach interim targets: since 2000, it has been estimated that as many as 7.8 million HIV-related deaths and 30 million new HIV infections have been averted. By 2020 the strategy aims to reduce global HIV-related deaths to below 500 000, to reduce new HIV infections to below 500 000 and to ensure zero new infections among infants [23].

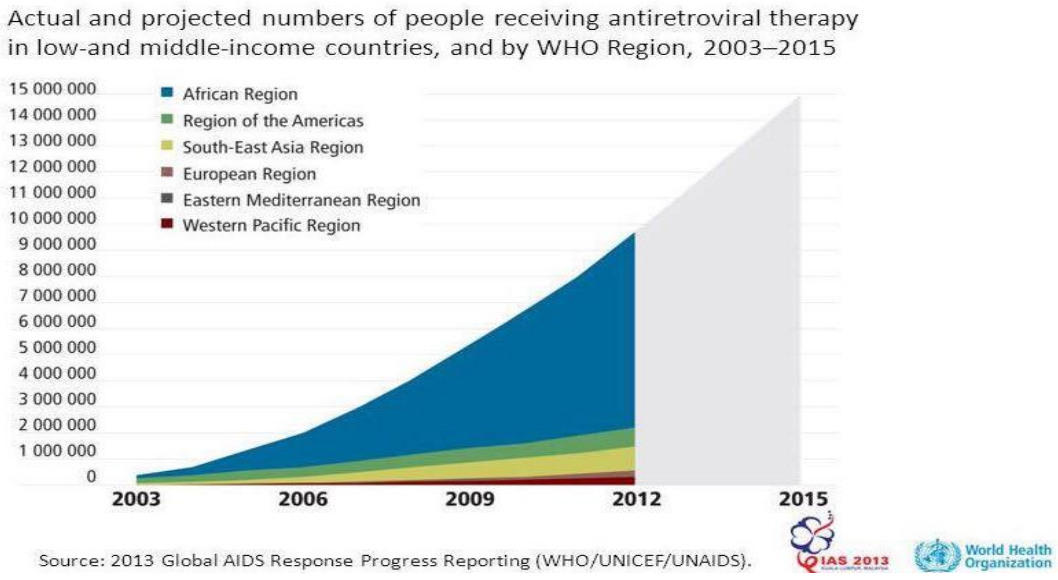
The above (Figure 1.4), obviously shows the number of people receiving ARV, Africa got 7530000, South-East Asia with 938000, America with 722000,Western Pacific with 308000, Europe with 199000, and East Mediterranean with 25100. The amount of usage of ARV partly reflect the prevalence of HIV in all regions. High income countries are marked with doted lines.

The below (graph 1.2) shows a general increasing trend in the accessibility of ART in all the regions from 2003 to 2012 with Africa being the highest, the usage reflects the high prevalence and incidence cases within the region.

Exclusive breastfeeding (EBF) provides infants nourishment at a lower risk of contamination, especially in poor households. Growth factors includes, hormones, peptide growth factors and cytokines in breast milk are known to improve the maturation of the infant's gastrointestinal system while maintaining mucosal integrity that limits the passage of pathogens and antigens from the lumen. Secretory immunoglobulin A antibodies, chemokines, complements, and other immune factors in breast milk protect against viral as well as bacterial infections. Protective effects of breastfeeding also occur from other substances that may augment the immune system and growth such as lactoferrin, lysozymes, nucleotides, and oligosaccharide [24].

The WHO recommends that women breastfeed their infants exclusively in the first 6 month of life to maximize the benefits of breastfeeding, with consideration of risk of mother-to-child transmission of HIV through breast milk and the benefits of breastfeeding [24]. The use of exclusive breastfeeding rather than 'mixed' feeding has been shown to provide some protection against infection, but it does not prevent all infections, with transmission rates in exclusively breastfed infants of up to 14% at 6 weeks and 20% at 6 months even in the best managed research settings [25].

Although, in well resourced settings, the complete avoidance of breastfeeding has been a major factor in reducing transmission, and breastfeeding is not recommended for HIV-infected women (including those receiving Highly Active Anti-Retroviral Therapy (HAART)) which could lead to increase in infant mortality and morbidity [25,26]. In both resource-rich and resource-poor settings, the use of replacement feeding has been documented to be safe and feasible, in places such as Thailand, Brazil and some African urban centers. It is not a feasible option in many very low resource settings like the rural communities of Africa [26].



Graph 1.2. Number of patient receiving ART

The WHO infant feeding guidance from 2006 reinforced the recommendation that avoidance of breastfeeding should only be recommended for HIV-infected women if affordable, feasible, acceptable, safe and sustainable (AFASS) and recommended weaning as soon as possible to reduce the ongoing risk of infections [27]. An increasing body of evidence since then from very low resource settings has demonstrated that early weaning may reduce HIV transmission risk but is balanced by a much higher rate of morbidity and mortality in the infants [28], and that in appropriate replacement feeding may have similar consequences. These effects appear to be more severe in infants born to mothers with more advanced disease and lower CD4 cell counts, adding to the urgency to provide appropriate antiretroviral treatment for these mothers [28].

This article determines the trend in HIV transmission at subsequent pregnancies, the recent reported evidence on the global prevalence of maternal HIV, the factors responsible for the unequal prevalence of maternal HIV in both resource-rich and resource-poor settings and the 2016-2021 HIV reduction strategies proposed by WHO and the financial backing of these strategies.

2. Methods and Materials

A comprehensive literature search was done to identify articles containing information on prevalence of maternal HIV. The following PubMed searches were used, keywords: prevalence of HIV, HIV risk factors, maternal HIV complication and ARV regimen. It was filtered to free articles, English, last 15 years, and human. Google scholar was used only to search for specific papers identified from the reference lists of published papers. These search terms were designed to be more broad than precise. Relevance to the research question was determined by review of the abstracts. The full texts of articles with relevant abstracts were reviewed to determine if the articles should be included according to the inclusion and exclusion criteria. Articles were included regardless of language in which they were written. PubMed is the largest database containing scientific articles that are written about health and medical related issues.

PRISMA principles [29] were strictly adhered to; it is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. PRISMA focuses on the reporting of reviews evaluating randomized trials, but can also be used as a basis for reporting systematic reviews of other types of research.

The other sources of data and strategy for HIV for the period of (2016-2021) were obtained from WHO, which is responsible for setting pace when it comes to international health, CDC as Center for Disease Control, and Figure and tables for comparing different countries were obtained from HFA Europe database.

The countries were categorized by gross national income as defined by the World Bank: high income, middle income (upper middle and lower middle), and low income [30].

3. Result

The flow chart (Figure 3.1) is based on PRISMA principle, a total of 121 titles and abstracts were identified for screening; 39 papers and abstracts were included in the full review while 82 papers and abstracts were excluded. On July 6, 2016, the literature search was done.

For both high income population and low income population settings, 121 articles were identified, among the 121 articles, 84 of the articles were screened out based on their titles and abstracts and duplicates, 47 of the remaining articles were further assessed and 8 articles were excluded (2 were not written in English, 4 did not focus on the outcome that is relevant to this review and 2 were not limited to maternal HIV), the remaining 39 articles were included in the study.

Figure 3.2 [30] The below figure was among the 39 studies that was evaluated for this research, it captures some of the key steps women must move through in order to maintain successful treatment for their HIV infection, with the figure organized into key cascade outcomes in the movement along a path towards treatment and the component steps that are necessary to achieve each outcome.

Two further points about the cascade are important. First, each sub-step in the cascade is itself potentially quite complex. Even something as straightforward as having a CD4 test (one step in ART assessment) is multi-faceted. This step requires that providers remember the need for testing and offer testing to the client; that tests are available; that women accept the test; that the tests are available at the time and place they need to be done; that the client actually undergoes the test; and that the results are produced and made available by the clinic in a timely manner. Secondly, although the first step of this cascade begins with ‘Access to the Health System’, it is essential to remember that many women who are pregnant and HIV-infected do not access the health system early enough in their pregnancy to go through all the steps of the cascade.

Table 3.1 was among the articles that were included for the research [32], the study centered on women who had children and are pregnant and also infected with HIV and a possible follow-up after parturition. Additional information included was: the outcome of the enrolment pregnancy; number of children since enrolment; pattern and breastfeeding duration of subsequent children. The maternal health cards were examined for medical records pertaining to CD4 counts and antiretroviral (ARV) therapy. Blood was drawn from the children for HIV testing. All the information from the mothers and children was collected on the initial visit. Infants who were still breastfeeding had blood samples later collected in order to confirm their HIV infection status after the cessation of breastfeeding.

Breastfeeding

At initial pregnancy, 36 of the 51 (76.2%) were still breastfeeding at nine months. For the subsequent pregnancy the mean duration of breastfeeding was 10.0 months (standard deviation [SD] 7.2) in those infected with HIV and 10.1 months (SD 5.9) in those who were uninfected (OR 1.0 [0.88–1.22]). The mean duration of exclusive breastfeeding in the older siblings was similar to those who were HIV-infected and those who were uninfected (3.1 months [SD 2.8] and 3.0 months [SD 2.5], respectively). At the subsequent pregnancy, HIV-infected children had a similar duration of exclusive breastfeeding periods (4.2 months [SD 2.6] versus 6.2 months [SD 3.3] for uninfected children, OR 0.76 [0.57–1.02]).

Antiretroviral drugs

None of the mothers from the initial pregnancy were on highly active antiretroviral drugs (HAART). At the subsequent pregnancy, 8.7% of those on HAART transmitted HIV compared to 9.3% who were not (OR 1.08 [0.14–12.82]). At the initial pregnancy 37.5% did not receive single dose nevirapine transmitted versus 36.8% of those who did receive nevirapine (OR 1.12 [0.23–5.34]). For the subsequent pregnancy, the percentages were 22.2 and 10.2, respectively (OR 2.51 [0.43–13.37]).

Maternal disease

Viral loads and CD4 counts were not done for the women at the initial pregnancy as it was not part of the standard of care at the time. Among the subsequent births 10 mothers who had CD4 counts of less than 200/mL, one (10%) had an HIV-infected child and three (7.1%) of the mothers with CD4 counts above or equal to 200/mL had a subsequent HIV-infected child (OR 1.44 [0.02–20.43]).

This result was not among the 39 included studies, it was extrapolated from the Europe HFA database. They countries were selected based on the world bank ranking of countries that is according to their gross domestic product (GDP), (Germany, France and Switzerland are classified as high income countries while Ukraine and Kazakhstan are classify as low income countries).

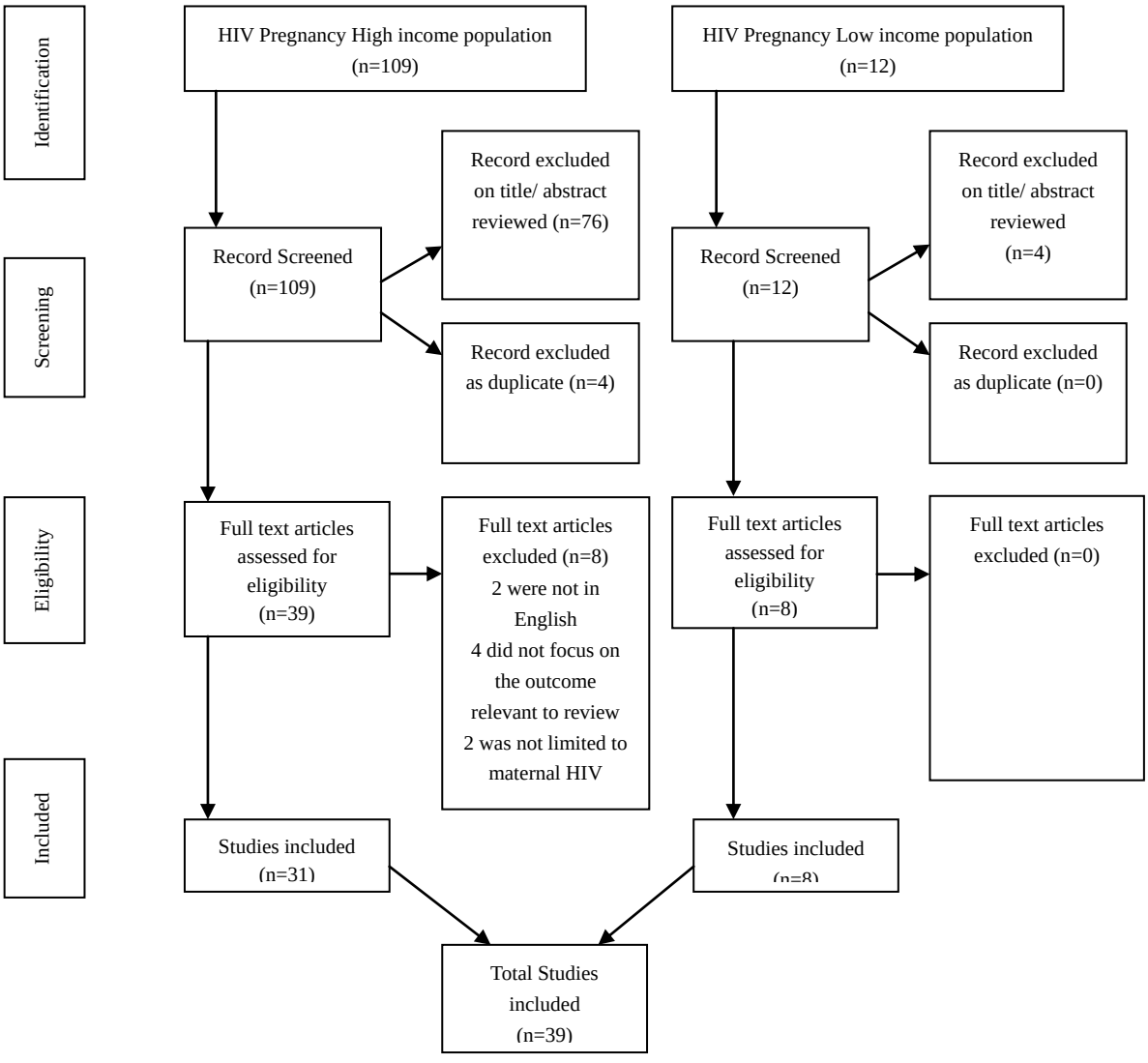


Figure 3.1. Flow chart

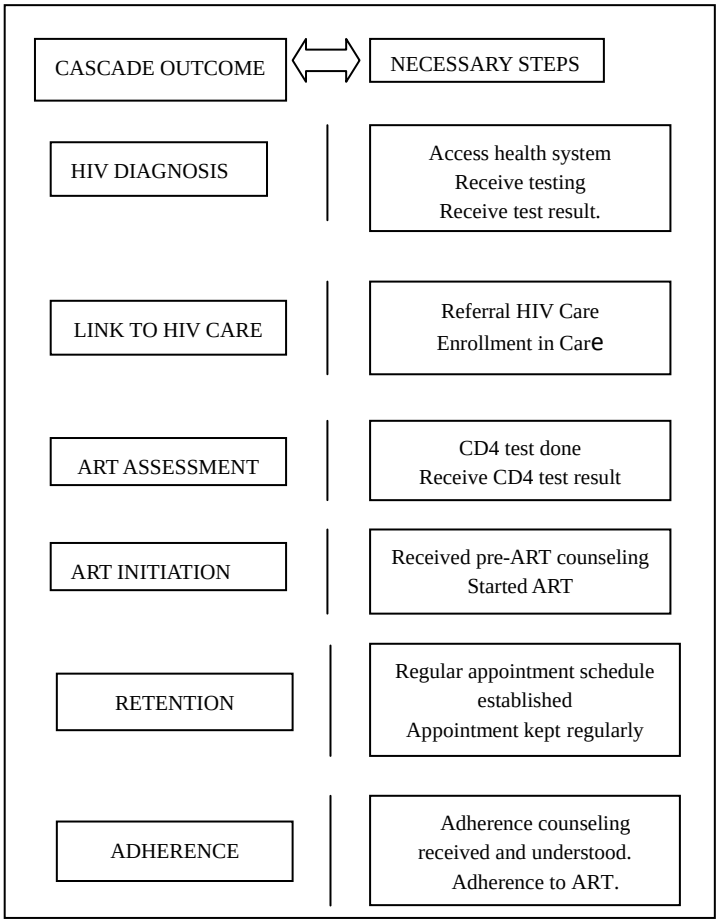


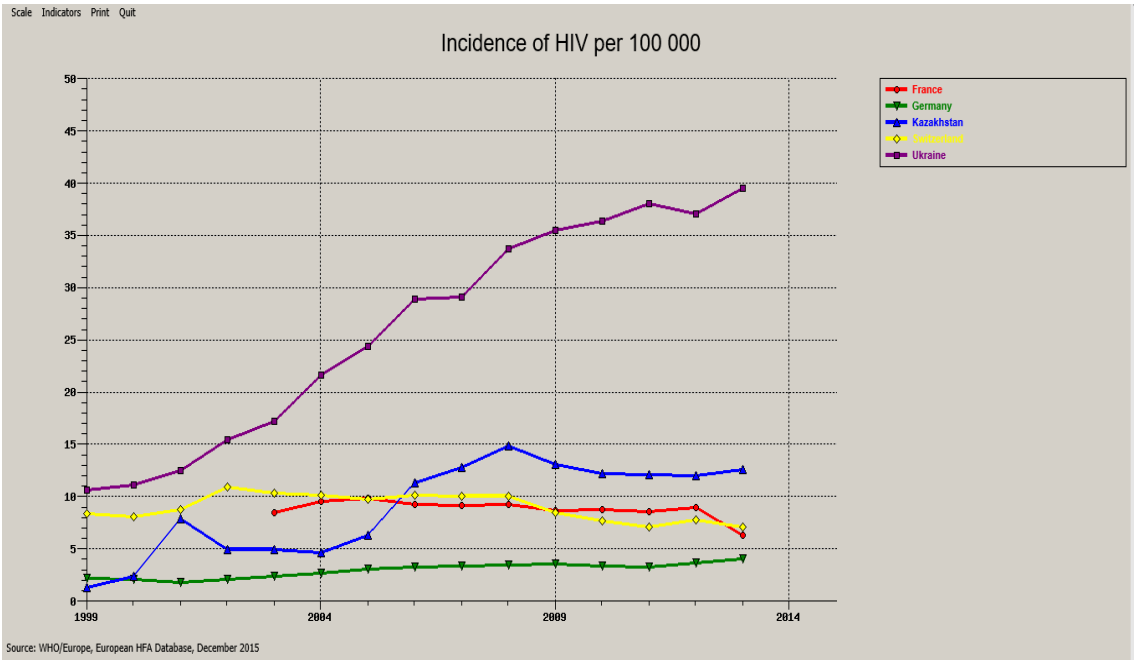
Figure 3.2. Maternal HIV cascade

Table 3.1. Factors associated with maternal HIV transmission

Factors	HIV-infected children	HIV-uninfected children	Unadjusted odds ratio 95%CI
Maternal CD4 count	N=4	N=48	
> = 200	3(7.1%)	39(92.9%)	1
< 200	1(10.0%)	9(90.0%)	1.44 (0.02-20.43)
Maternal HAART	N=6	N=60	
on treatment	2(8.7%)	21(91.3%)	1
not on treatment	4(9.3%)	39(90.7%)	1.08 (0.14-12.82)
Mother and child nevirapine	N=9	N=58	
Yes	5(10.2%)	44(89.2%)	1
No	4(22.2%)	14(77.8%)	2.51 (0.43-13.37)
Duration of exclusive breastfeeding in month	N=9	N=55	
mean SD	4.2(2.6)	6.2(3.3)	0.76 (0.57-1.02)
Duration of breastfeeding in month	N=9	N=55	
mean SD	10.0(7.2)	10.1(5.9)	1.0 (0.88-1.12)

HAART; Highly Active Antiretroviral Therapy
SD; Standard Deviation

The below (graph 3.1) [33], shows that the rate of incidence of HIV is disproportionately highest within the low income countries (Ukraine and Kazakhstan) 13 and 39 cases per 100000 populations were recorded for both Ukraine and Kazakhstan respectively. And a low incidence rate was recorded for the high income countries. France, Germany and Switzerland recorded 6, 4, and 8 cases per 100000 populations the 2013. From the above result it can be deduced that higher a country's GDP the lower the HIV incidence.



Graph 3.1. The incidence of HIV from (1999-2013) in high and low income country

4. Discussion

4.1. Human Resources Shortage and Workload as a Major Factor Responsible for the Unequal Global Maternal HIV

There are critical human resource shortages in all areas of health care throughout Africa and most low income countries around the globe. Absolute shortages are compounded by inequitable distribution between urban and rural areas, as well as heavy workloads, insufficient training, weak management and low staffing ratios which increase stress and burn-out for health workers, contributing to poor quality care [34]. Low-income women face many threats to their health and well-being. Relative to affluent women, low income women experience enhanced vulnerability to almost every disease and show higher rates of mortality [35].

Furthermore, the lack of human resources available to provide HIV care and PMTCT are illustrative of the severity and consequences of these shortages which are also present in other areas of MCH service provision and across the health system, which ultimately accounts for the differences in prevalence between resource limited and high income countries. For instance, an estimation of the human resources needed to deliver universal coverage of ART in sub-Saharan Africa by 2017 found that this could only be achieved if the population of health workers doubled each year over a decade and factors such as out-migration were kept to a minimum [36]. A modeling study which looked at the financial and human resources needed to provide recommended interventions for maternal and child health in the context of PMTCT in seven sub-Saharan African countries found that only three countries (Rwanda, Burkina Faso and Zambia) had sufficient funds (mostly from foreign aid) and only one (Zambia) had sufficient human resources to scale up the interventions by 2010 and sustain them to 2015 [37].

From (figure 3.2, 3.3) the rapid expansion of programmes to improve coverage should neither compromise the quality of services nor contribute to inequities in access to services and health outcomes. Countries like Ukraine and Kazakhstan and the entire Africa continent (low resource) should monitor the integrity of their continuum of maternal HIV services to determine where improvements can be made. Services should be organized to minimize "leakages" and maximize retention and adherence. Major challenges include: acceptability and uptake of effective prevention interventions; targeting HIV testing and counseling to achieve greatest yield; ensuring quality of testing to minimize incorrect diagnosis; linking people diagnosed to appropriate prevention and treatment services as early as possible [38].

However (table 3.1) the main point is that the HIV transmission rates at subsequent pregnancies might be lower but not complete prevention because of improved PMTCT in the breastfeeding resource-limited setting and the profound CD4 count which is significant in the estimation of transmission rate of HIV. This is an important factor when counseling HIV-infected women who want to have more children. Maternal HAART should be made more accessible for women at least from 35% to 100% in this setting, as it has been shown to have effect in the improvement programmes.

Consequently, the unequal prevalence of maternal HIV as stated, in 2012 by the United Nations Interagency Task Team on the Prevention and Treatment of HIV Infection in Pregnant Women and Children stated bluntly that at the present time there are simply not enough health workers in the 22 countries with the highest burden of mother-to-child

HIV transmission to meet the goals of the Global Plan for the Elimination of Mother-to-Child Transmission of HIV and keeping their mothers alive [39].

In short, these findings suggest, not surprisingly, that the quality of antenatal counseling for both women living with HIV and HIV negative women was negatively impacted by limited human resources and the level of mothers' education which can also be accounted for as a factor leading to the unequal prevalence of maternal HIV case in both settings (resource limited and resource rich).

4.2. Overcoming the Challenges to PMTCT in Resourse Rich Settings

In countries with low prevalence like (France, Switzerland, Germany), [figure 3.2] there is Community monitoring and accountability mechanisms which generate political will for better service quality, demand for services, and social support to women living with HIV which ultimately improve health outcomes. And most women living in these countries are always exposed to ART whenever they conceive which equally plays a key role in combating maternal HIV-transmission rate. Immigrants from lesser-resourced countries account for an increasing proportion of HIV exposed deliveries in mostly high income countries [40].

Though from (figure 3.2 and 3.3) immigrant HIV-infected women of childbearing age comprise an increasing percentage in many resource-rich countries, their PMTCT problems relate more to health care access and utilization than to biomedical issues. There seems to be better health services in those countries (Germany, France and Switzerland) which evidently reflect in their country's incidence and prevalence of HIV which could be as a result of adequate public health awareness, investing more on the health sector and good human resource managements.

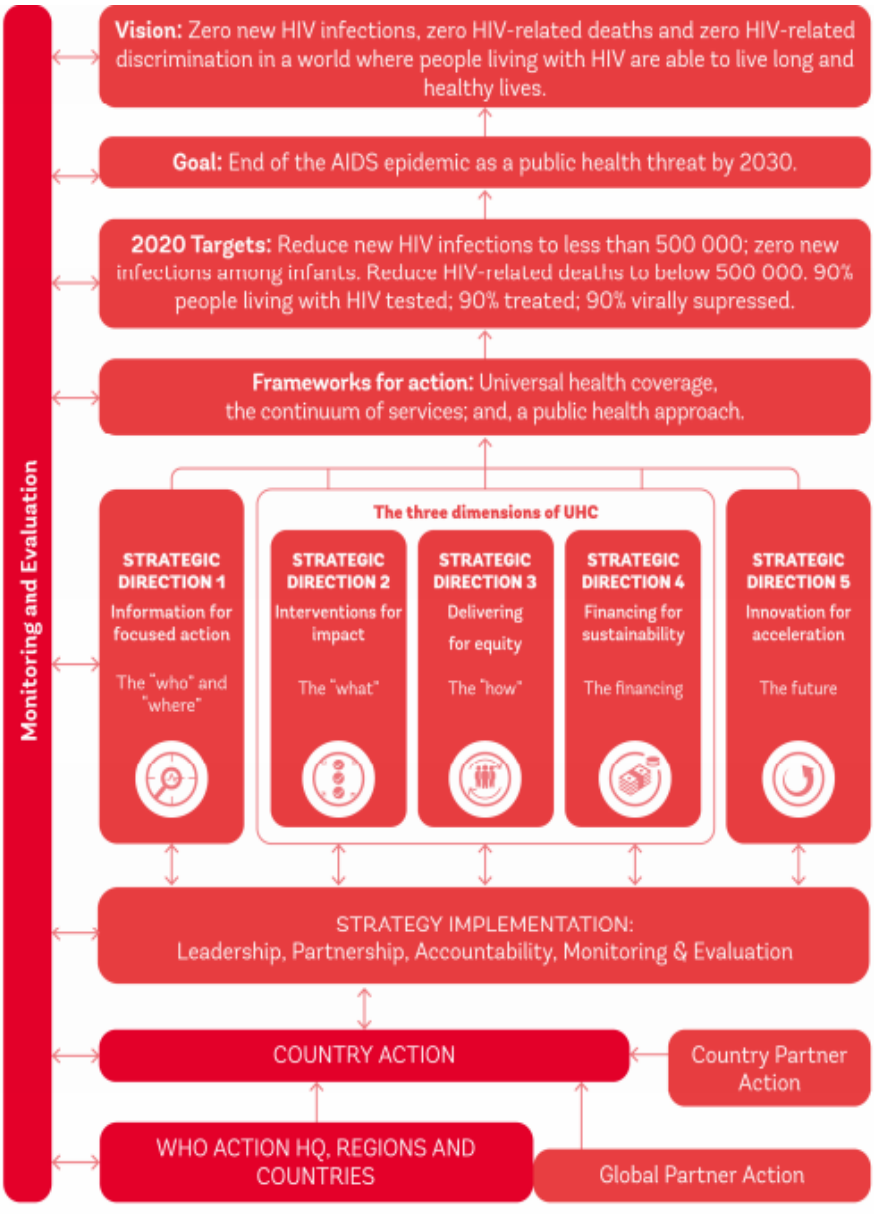


Figure 4.1. Outline of the global strategy on HIV 2016-2021

In the US, most of the ongoing mother-to-child transmissions are apparently attributable to incomplete uptake of elements of the Perinatal Prevention Cascade, as included in (figure 3.2) e.g., identification of HIV-infected women and effective retention of them in care [41].

The expansion in medical care access in the U.S. anticipated from the Affordable Care Act may mitigate some of poverty's effects unlike some resource-limited countries like Nigeria, but it can be predicted that the social instability and segregation associated with poverty will continue to aggravate problems of access in both settings [42]. Indeed, in this era of low MCT rates, as each transmission's specific characteristics take on heightened importance, it remains important to review cases, with the goal of changing the local system in ways that may prevent further transmissions and improve the care of HIV-infected women to optimize their health prior to —and between—pregnancies, as well as to prevent unwanted pregnancies.

The figure 4.1 was not among the 39 articles that were included for the study; it was gotten from the WHO website. WHO maps out the strategies for the elimination of HIV from 2016-2021 and the financial estimate when implementing the strategy.

The above WHO draft focuses explicitly on steps to be taken to avert HIV incidence to zero and zero HIV related death, which ultimately mean, eradicating HIV epidemic as public health threat by 2030 by adopting the Universal Health Coverage [UHC] strategies in partnership with leaders of countries and regions of the world.

4.3. Financial Implication of Maternal HIV Cure and Future Trends (Who 12.01.2015 Drafts)

However, the resources mobilized from all sources for HIV programmes in low- and middle-income countries increased by an additional US$ 250 million from 2012 to reach US$ 19 100 million in 2013 and then increased again to an estimated US$ 21007 million in 2015. The rising trend was due mainly to greater domestic investments, which comprised about 57% of the total in 2014. Nevertheless, investments in HIV will need to grow to US$ 31 900 million in 2020 and US$ 29 300 million in 2030 if long-term control of the epidemic is to be achieved [42].

The Global health sector strategy on HIV, 2016–2021, from (figure 4.1) describes the health sector contribution to the goal of ending AIDS as a public health threat by 2030. The costing of implementation of the strategy has been undertaken based on the costing of the UNAIDS 2016-2021 Strategy, which used specific targets and unit costs for the interventions included in the strategy. The total costs of the present draft strategy (figure 4.1) are estimated to rise from about US$ 20 000 million in 2016 to just over US$ 27 000 million in 2020 before declining somewhat to US$ 26 000 million in 2021. Antiretroviral therapy requires the largest amount of resources, about 36% of the total. Prevention for people who inject drugs is the next largest component at 13% and HIV testing services are next at 11%. One quarter of all resources is required for four countries (in order of burden): South Africa, Nigeria, Brazil and China. The top 20 countries account for 65% of needs. Just over half of all resources (53%) are needed in sub-Saharan Africa. The next largest region is Latin America and the Caribbean at 18%, followed by Eastern Europe and Central Asia at 9%, South-East Asia at 7%, the Western Pacific at 7% and the Eastern Mediterranean at 6%. About one-third of resources are needed in low-income countries and about one-quarter in lower middle-income countries [42].

4.4. Conclusions

These findings suggest a strong relationship between GDP of a country, workforce, and advancements in technology as factors responsible for the unequal prevalence of maternal HIV in both resource-limited and resource-rich settings, in different regions of the world.

With limited available resources, countries need to plan carefully, setting ambitious but realistic targets, and develop strong investment cases. The investment case should provide justification for an adequate allocation of domestic resources, facilitate the mobilization of external resources and help identify global partners who would support their efforts in combating maternal HIV.

The investments being made to reduce the prevalence of maternal HIV mortality and increase access to HIV treatment in sub-Saharan Africa and other resource limited regions of the world over the years are so far significant. The scope of these investments should further be reflected in support for further research, training of qualify health personnel’s and volunteers for easy access of ART to infected women and evaluation that fills priority knowledge gaps and assesses the impact of these investments on health outcomes. Vital registration and health information systems need to be strengthened by improving access to ART; implementing health promotion programs combined with HIV risk-reduction strategies; and scaling up HIV screening to identify infected patients early enough and link them to care by proven strategies toward reaching this goal.

When all this measures are put in place, no doubt a free maternal HIV world and perhaps a better world would be sustained for the present and future generations yet unborn.

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