

# Antenatal Education to Support Triple Elimination Program: A Systematic Literature Review

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**Abstract:** This study aims to describe cases of transmission of HIV, hepatitis B and syphilis from mother to child and how the role of antenatal education in supporting the triple elimination program. This research was conducted using a systematic literature review approach. Researchers collected data from research articles that have been published in Scopus indexed international electronic journals. Data was collected using several keywords with the Google search engine and portals providing articles from Scopus indexed journals, such as ScienceDirect, MDPI, and NCBI. The data collected was then analyzed by researchers using an interactive data analysis model. The results of the analysis found that the implementation of triple elimination has been successfully carried out in various countries, although there are still various obstacles that must be faced in its implementation. Furthermore, several studies have also found that antenatal education has an important role in reducing the risk of transmission of HIV, hepatitis B and syphilis from mother to child. So, it can be concluded that antenatal education is crucial to provide in order to support the triple elimination program to prevent cases of transmission of HIV, hepatitis B and syphilis from mother to child.

**Keywords:** Antenatal education; Hepatitis B; HIV; Syphilis; Triple elimination.

## Introduction

HIV infection, syphilis, and hepatitis B are three infectious diseases that are highly susceptible to transmission from mother to child during pregnancy, childbirth, and breastfeeding (Fatimah, 2020). The prevalence of HIV infection in expectant women in the Asia Pacific was 71,000 cases and only 46% received antiretroviral therapy (ART). About 167,000 cases of incidence of syphilis infection in pregnancy and (15%) endure chronic hepatitis B. The Elimination of Mother-to-Child Transmission (EMTCT) program can furnish the greatest possible chance for every child to begin a healthy life free from infectious diseases (World Health Organization, 2018).

HIV infection is an enveloped retrovirus that contains 2 copies of a single-stranded RNA genome. As we know, HIV is the cause of Acquired

Immunodeficiency Syndrome (AIDS), which is the last stage of HIV disease (Schenkel & Gupta, 2021). Every year there are at least two million new people who have AIDS and until 2019 there have been 39 million people who have died from the disease (Tepe-Mensah et al., 2022). This fact makes AIDS, to date, one of the most feared diseases in the world.

No less dangerous, the hepatitis B virus (HBV) is also a very dangerous virus. HBV is a DNA-based virus, a member of the *Hepadnaviridae* family, which can cause liver disease and an increased risk of hepatocellular carcinoma in infected individuals, replicates within hepatocytes and interacts with several cellular proteins (Rizzo et al., 2022). This virus can cause acute and chronic liver inflammation (Sausen et al., 2022). As a result of the disease caused by HBV, at least 884,000 people are reported to die each year (Tu et al., 2020). Meanwhile, the number of people infected with HBV

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has reached 350,000,000 people every year (Seo et al., 2022). So, HBV is also a very scary thing for the community.

Likewise, with Syphilis, this disease is a systemic disease caused by the spirochete *Treponema pallidum* (TP) and is one of the oldest known diseases (Smith et al., 2021; Tiecco et al., 2021). Syphilis has been a major cause of morbidity and mortality for more than 500 years. This is because this disease can attack various important organs such as the brain, eyes, ears, heart, and even the fetus (Jaiswal et al., 2022).

The spread of these three infectious diseases can occur due to sexual intercourse and can also occur due to transmission from mother to child (Peliganga et al., 2022; Zhang et al., 2020). For HBV cases, transmission from mother to child is the main route of transmission that occurs (Zheng et al., 2022). With the high rate of spread of the disease, it is necessary to make special efforts to reduce the risk of these three types of disease. Efforts that have been made include the Triple Elimination program and antenatal education. Triple Elimination is a program carried out to eliminate transmission from mother to child of three diseases, HIV, syphilis and hepatitis B (Cohn et al., 2021). This effort is made so that even if the mother is infected with HIV, syphilis, or hepatitis B, it will not be transmitted to her child. Whereas antenatal education is a program that includes risk identification, prevention and management of pregnancy-related illnesses, but also health education, health promotion, support and guidance to facilitate the transition to parenthood (Delzer et al., 2021).

A number of studies have been conducted on cases of HIV, hepatitis B and syphilis. Likewise, with research that examines how antenatal education in an effort to reduce the risk of spreading the three diseases. To get a comprehensive picture of the results of the research, the researcher conducted this systematic literature. Broadly speaking, this research is focused on describing cases of transmission of HIV, hepatitis B, and syphilis from mother to child and how the role of antenatal education in supporting the triple elimination program.

## Method

This research was conducted by following the steps of a systematic literature review. The systematic review steps include designing a review, conducting a review, analyzing, and writing a review (Snyder, 2019). The data in this study are published research results. There are several conditions followed in data selection. First, the data is selected from articles published in international online journals indexed by Scopus. Second, the articles collected are articles published from 2017 to 2022. Third, the articles discuss the spread of HIV, hepatitis B, and

syphilis caused by transmission from mother to child and about how antenatal education is related to the implementation of triple elimination. The researcher collected articles from several websites providing articles published in Scopus indexed journals such as ScienceDirect, NCBI, and MDPI, through the Google search engine and using certain keywords. The data collected was then analyzed qualitatively using an interactive data analysis model. There are three stages carried out according to the interactive data analysis model, namely data reduction, data display, and conclusion drawing/verification. If depicted in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram which consists of three stages, identification, screening, and included (Page et al., 2021). It will look like in Figure 1.

## Result and Discussion

The research data comes from research results that have been published in Scopus indexed international journals obtained through ScienceDirect, MDPI, and NCBI. To obtain data, the researcher uses several keywords such as 'triple elimination', 'antenatal education', 'HIV, HBV and syphilis prevalence.' The researcher uses the help of the Google search engine to find the articles that the researcher needs. From the search data, it was found that articles were successfully collected from ScienceDirect, MDPI, and NCBI which were indexed by Scopus (n = 278), the same article was omitted (n = 67), the article after the same article was deleted (n = 211), the article was omitted with inappropriate year coverage (n = 93), Articles after articles with inappropriate years were omitted (n = 118), Elimination of articles with content that did not match the research objectives/limitations (n = 87), Articles included in the review (n = 31). The following are the findings of studies related to triple elimination. Results should be clear and concise. The discussion should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

In accordance with the research objectives, there are three things to be achieved in this study. First, to describe cases of transmission of HIV, hepatitis B, and syphilis from mother to child. Second, the implementation of triple elimination in reducing the rate of spread of HIV, hepatitis B and syphilis from mother to child. Third, explaining the role of antenatal education in dealing with these cases, especially in terms of triple elimination. Thus, this section describes the findings regarding these three matters.

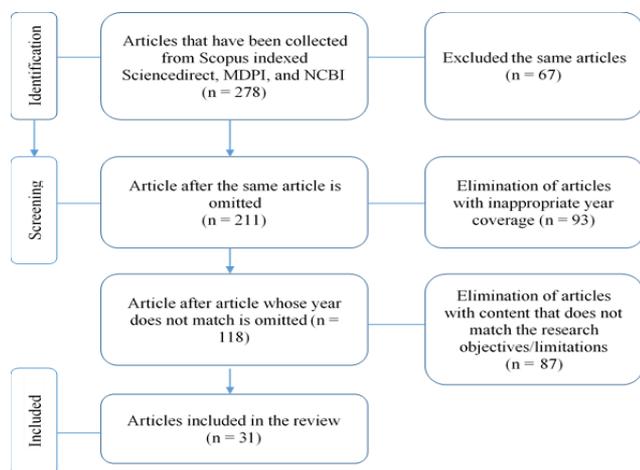


Figure 1. Prisma model

*The spread of HIV, hepatitis B, and syphilis resulting from transmission from mother to child*

Globally, cases of the spread of HIV, hepatitis B and syphilis through mother-to-child transmission are still relatively high, although there is a tendency to decrease. Annually, an estimated 180,000 infants in the West Pacific Region are infected with hepatitis B, 13,000 by syphilis and 1400 by HIV through mother-to-child transmission (Woodring et al., 2017). By 2021, it is estimated that there will be 160,000 new HIV infections globally among children aged <15 years, a significant decrease from >400,000 cases in 2000 (Elgalib et al., 2023).

The reduction in cases of transmission of HIV, hepatitis B, and syphilis from mother to child is more significant in countries with strong economic conditions compared to countries with weak economic conditions (Wang et al., 2021). In addition, there is a trend towards more new HIV infections in adults and children in countries with lower than higher prevalence due to less coverage of ART for adults, pregnant women and children (Kempton et al., 2019).

The prevalence of HBV in pregnant women in China tends to decrease but is still categorized as moderately endemic (Liu et al., 2022). From 2010 to 2016, the rate of mother-to-child transmission decreased significantly from 19.4% to 9.6% for human immunodeficiency virus, and from 116.3 to 13.6 cases per 100,000 live births for syphilis (Wu et al., 2019) A reduction in cases of HBV transmission through mother-to-child transmission was also found in Thailand (Posuwan et al., 2020).

However, for countries on the African continent, the prevalence of HIV and HBV is still high in these countries. As an example, HIV prevalence in Botswana, Africa, especially among pregnant women, is still reported to be high (Shava et al., 2019). A similar thing also happened to the prevalence of HBV in Sierra Leone,

Africa, where the high prevalence was caused by the lack of available health facilities and resources (Yendewa et al., 2021).

In Indonesia, the prevalence of HIV, hepatitis B and syphilis is still relatively high. In addition, for cases, transmission from mother to child, which is also known as 'vertical transmission', is the most common cause of HIV infection in children under the age of 15 (Adawiyah et al., 2022). The high prevalence in Indonesia occurs due to stigma and discrimination for those infected with HIV and limited health facilities and available human resources in areas outside Java and Bali.

*Triple Elimination Program to suppress the spread of HIV, HBV, and syphilis*

The implementation of triple elimination in China is proven to reduce MTCT rates. For the prevalence of HIV, it was found that it decreased from 7.4% to 3.6% between 2011 and 2020 (Wang et al., 2021). Even for the spread of HBV, it was found that the Elimination program was able to reduce the 90% rate of HBV transmission from mother to child and it is believed that the program will succeed in eliminating the spread of HBV from mother to child by 2030 (Zheng et al., 2022).

Specifically for the Guangxi area, based on data for 2009-2018, it was found that there was a decrease in the prevalence of HIV from 0.54% to 0.10%, a decrease in the prevalence of HCV from 0.40% to 0.05% and a decrease in the prevalence of syphilis from 1.53% to 0.30% (Zhong et al., 2022). Similar results were also found in Hunan, South-Central China. From 2010 to 2016, the rate of mother-to-child transmission decreased significantly from 19.4% to 9.6% for HIV, from 116.3 to 13.6 cases per 100,000 live births for syphilis, and the proportion of children who received the injection hepatitis B immunoglobulin within 24 hours after birth increased from 95.2% to 98.9% among exposed neonates (Wu et al., 2019).

For implementation in Indonesia, it was found that the triple elimination program could not be carried out optimally due to several problems. These problems include, there are no local policies and guidelines for PMTCT programs and services; HIV testing in pregnant women has not reached 100% on target; limited human resources; limited assistance activities to ensure antiretroviral (ARV) adherence, and HIV-positive women face stigma and discrimination from the community and health workers (Siregar et al., 2021). To overcome the problem of limited facilities and infrastructure and human resources, it is necessary to develop an effective and efficient triple elimination implementation model that is adapted to situations and conditions (Moyo & Mavhandu-Mudzusi, 2021).

Specifically, regarding issues of stigma and discrimination, which hinder HIV elimination

programs, also occur in various countries such as Brazil, Africa, India, and Tanzania (Abbamonte et al., 2020; Hakawi & Mokhbat, 2022; Lalhruaimawii et al., 2022; Vargas et al., 2020; Watt et al., 2020). This stigma and discrimination make those infected with HIV reluctant to get health services (Oladunni et al., 2021). They will be afraid of being marginalized and choose to keep their health conditions secret (Lubega et al., 2021).

#### *The role of antenatal education in Triple Elimination efforts*

Women living with HIV who are pregnant or contract the virus during pregnancy are at risk for maternal and perinatal morbidity and mortality, especially if the virus is not well controlled. In addition, there is a risk of vertical transmission to the fetus during pregnancy and postpartum delivery through breastfeeding (Chilaka & Konje, 2021). The use of antiretrovirals in pregnancy has been shown to minimize mother-to-child transmission of HIV (Cervený et al., 2021). Antiretrovirals are also the most effective method of preventing mother-to-child transmission and by improving the mother's health, increasing her child's chances of survival (Agabu et al., 2020). Such as the implementation of Option B Plus combination antiretroviral therapy which has been shown to be able to reduce HIV transmission from mother to child (Omonaiye et al., 2019; Zijenah et al., 2021). Thus, caring for pregnant women living with HIV not only meets their individual health needs but also significantly reduces the risk of transmission, especially for women with advanced disease and a higher risk of transmission (Gupta et al., 2020; Muyunda et al., 2020).

Antenatal education can help increase awareness of pregnant women to carry out initial screening in the triple elimination effort (Shava et al., 2019). Pregnant women who receive antenatal education are more obedient in implementing the triple elimination program, thereby increasing the success of the program (Sebastião et al., 2020). For pregnant women who adhere to antenatal care programs and triple elimination have been shown to be able to protect their fetuses from transmission of HIV, HBV and syphilis (Biadgo et al., 2019). In addition, raising awareness is very important because sexually transmitted infections (STIs) are often asymptomatic, diagnosis and treatment may be delayed, and infected people can transmit the infection to others without realizing it (Lawson, 2022; Rudi et al., 2020). Furthermore, untreated STIs can lead to severe and irreversible health outcomes.

## **Conclusion**

From the data obtained, it was found that the prevalence rates of HIV, HBV, and syphilis were still relatively high, although in several countries the

numbers had decreased. The Triple Elimination Program has been proven to help reduce the number of cases of transmission of HIV, HBV, and syphilis from mother to child. However, in various regions, the implementation of the Triple Elimination program is still experiencing problems due to limited human resources, facilities and infrastructure. In addition, it was also found that antenatal education has a crucial role in building public awareness to support the triple elimination program. Thus, it can be said that antenatal education encourages the success of triple elimination so as to reduce cases of HIV, HBV and syphilis transmission from mother to child. Considering that this research was conducted using only secondary data from the results of previous studies, it is necessary to carry out further research regarding the extent to which antenatal education plays a role in the success of triple elimination quantitatively.

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#### **Author Contributions**

Conceptualization, N.K.S., and I.M.A.W.; methodology, N.K.S. and I.M.A.W.; software, N.K.S.; validation, N.K.S., and I.M.A.W.; formal analysis, N.K.S.; investigation, N.K.S., and I.M.A.W.; resources, N.K.S.; data curation, N.K.S.; writing—original draft preparation, N.K.S.; writing—review and editing, N.K.S.; visualization, N.K.S.; supervision, I.M.A.W.; project administration, X.X., All authors have read and agreed to the published version of the manuscript.

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#### **Conflicts of Interest**

The authors declare no conflict of interest.

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## Apendix

**Table 1.** Study Findings Related to Triple Elimination

No	Types of Study	Author, Year, and Country	Sample	Result
1	Review articles	Tiecco et al., 2021, Switzerland	67 articles	Syphilis still presents several challenges: identification and prevention of reinfection, appropriate monitoring of therapy with serological tests, and appropriate early detection of asymptomatic neurosyphilis. Biomedical interventions such as PrEP, PEP and vaccines for syphilis are not available and condom use remains the main option for syphilis prevention.
2	Prospective observational study	Gupta et al., 2019, India	66 pregnant women with HIH	The risk of mother-to-child transmission of HIV is reduced with combination ART use, and the emergence of drug resistance is reduced. HAART used during pregnancy appears to be well tolerated and safe.
3	RCT (Randomized Control Trial)	Lubega et al., 2020, Uganda	24 clinics in the treatment groups and 8 clinics in the control group.	Providing information about nutrition leads to increased nutritional intake and overall health. Participatory informational interventions, such as cooking demonstrations and expert presentations, have been shown to empower and inspire participants to be more ambitious and invest in income-generating activities.
4	Retrospective study	Kwang-II Seo, 2022., Korea Selatan	13,942 patients diagnosed with ML (Malignant Lymphoma).	Viral activity can independently affect the prognosis of ML (Malignant Lymphoma). In addition, cirrhotic patients have a poor survival rate after the diagnosis of ML, and even worse on decompensation. Clinically, data shows that the type of antiviral does not affect the risk of ML.
5	Review articles	Lalhruaimawii, 2022., India	20 Articles.	The lack of utilization of these facilities by HIV-infected patients is due to the existing stigma indicating a low quality of life and poor mental health which exacerbates their disease condition. This review examines where and how stigma forms in India due to social beliefs, ethics and moral values related to cultural background.
6	Cross-sectional study	Wang, 2022., China	115,789,148 pregnant women in China.	Hepatitis-B infection is more concentrated in populations with low economic status. The results of the study highlight the importance of developing equity-oriented policies and targeted interventions to reduce Hepatitis-B infection among the poor and hard-to-reach communities.
7	Retrospective cohort study	Muyunda et al., 2020, United Kingdom	1,444 mother-infant pairs.	Increasing access to lifelong ART and increasing retention for women on treatment has the potential to further reduce vertical transmission.
8	Repport	et al, A. Elgalib, 2023, Oman	Articles, Guideline, policy and primary data.	HIV, syphilis and hepatitis remain global health problems that cause significant morbidity and mortality. Although the launch of EMTCT by WHO was carried out since 2014, the number of countries where HIV and syphilis are validated is still very small. To achieve the target, WHO and other UN partners must continue advocacy, political diplomacy and technical support for the implementation of triple EMTCT.
9	Cross sectional study	Peliganga et al, 2022., Angola	1,012 of pregnant women.	The results highlight the importance of antenatal HBV screening, antiviral prophylaxis for HBeAg positive or high viralload mothers, and appropriate first-dose hepatitis B vaccine in newborns.
10	Descriptive article	Transfus Med Jerman, 2016.,	Articles, Guideline, and policy.	HIV is genetic. Continuous monitoring of circulating virus is necessary to enable early detection of new HIV variants that appear as early as possible and to allow adaptation and improvement of HIV detection test systems.
11	Review articles	Rizzo, 2022, Italia	Articles.	Available data provide evidence that HBV infection is associated with a risk of developing HCC with or without

12	Review articles	Liu et al, 2022., China	42 articles.		underlying cirrhosis of the liver, due to various direct and indirect mechanisms that promote hepatocarcinogenesis. The prevalence of HBV in Chinese pregnant women was 6.64% (95% CI: 5.72–7.57%) over the period between 2016 and 2021. Among HBsAg positive pregnant women, the HBeAg positive rate was 25.80% (95 % CI: 22.26–29.69%). In addition, the geographic areas where HBV prevalence ranks from high to low are in western China, eastern China, and central China, respectively.
13	Descriptive article	Chilaka & Konje, 2022, Qatar	Article, guideline, dan policy brief.		ART duration and viral load suppression and duration are important factors in preventing MTCT. When the viral load is well suppressed, delivery should not be any different from that of other women, and most interventions should be obstetrically indicated. However, if the viral load is not suppressed or if the HIV status is unknown, special care should be taken in planning labor and delivery to prevent perinatal transmission of the virus to the baby.
14	Cross sectional	Sebastião et al, 2018., Angola	1,612 pregnant women.		Pregnant women under the age of 25 years were significantly protected from HIV infection [AOR: 0.43 (95% CI: 0.20-0.91), p=0.026]. Coinfection 1.3 times (AOR: 0.04-41.0) at the age of less than 25 years, 7.0 times (AOR: 0.50-99.2) in urban residents, and 1.4 times (AOR : 0.10-20.9) in pregnant women with a high level of education.
15	Review articles	Pendse et al, 2016., India	Article.		The future of HIV response requires that governments collaborate with communities, address stigma and discrimination, and invest every household efficiently in evidence-based HIV testing and treatment interventions for vulnerable and at-risk populations.
16	Opinion article	Woodring et al, 2017., Philipina	Articles, guideline, dan policy brief.		The Triple Elimination Framework suggests a set of key policy, impact and program indicators for monitoring and evaluating EMTCT. This includes the development of global guidelines that include hepatitis B in the WHO criteria for HIV EMTCT and syphilis. The Triple Elimination Framework also needs to be complemented by an economic analysis of the introduction of additional interventions for hepatitis B EMTCT. This is relevant for countries with high dose hepatitis B vaccine coverage rates and high third dose coverage rates.
17	Policy Brief	Liu et al, 2022., China	Articles, guideline.		In order to standardize the clinical management of HBV MTCT prevention and achieve zero HBV infection among infants, the Chinese Foundation organized experts to devise a management algorithm for HBV MTCT prevention based on the latest research advances and guidelines, including 10 steps of pregnancy management and postpartum follow-up, among which is screening , antiviral medication, and infant immunization are its core components.
18	Regeresi linier	Kempton et al, 2019., UK	56 Countries with an epidemic of more than 40,000 HIV cases.		The 12 countries with higher prevalence accounted for 16.7 million and the 44 countries with lower prevalence for 15.1 million people living with HIV, together accounting for 87.5% of the global estimate. Countries with lower prevalence have less coverage of ART for adults, pregnant women and children, lower rates of EID and higher rates of AIDS-related death. There are more new HIV infections in adults and children in countries with lower prevalence than in countries with higher prevalence.
19	Studi cohort	Zijenah et al , 2021., Zimbabwe	451 women.		Seven mothers (1.55%) had passed HIV-1 infection to their babies within 6 months. Four infants (0.88%, 95% confidence interval (CI) 0.26–2.33%) were infected with IU, one infant (0.22%, 95% CI 0.1.4%) was infected with IP, and

20	Cross sectional	Agabu et al, 2020., USA	1,040 pairs of mothers and babies aged 4-12 weeks.	two infants ( 0.44%, 95% CI 0.01-1.7 %) infected with PP. The infant mortality rate was 0.88% (95% CI 0.26-2.33%). Women already on preconception ART had the lowest prevalence of MTCT emphasizing the importance of early HIV diagnosis and initiation of treatment before pregnancy.
21	Cross sectional	Hui et al, 2020., China	China National Health Survey data (1979-2014).	The review projects that, if current levels of HIV prevention interventions are maintained, China will reach its elimination target by 2029. By modeling various intervention scenarios, the review finds that this can be advanced to 2025 by increasing birth dose vaccination coverage to 2024. by administering tenofovir to HBeAg positive pregnant women. target achievement in 2025 is predicted by measuring less than 2% MTCT in 2020.
22	Cross sectional	Omonaiye et al, 2019., Denmark	275 HIV positive pregnant women.	In multivariable logistic regression analysis, there was a positive relationship between increase in education level (OR = 1.7, p = 0.006) and disclosure of HIV status (OR = 2.3, p = 0.024), and treatment adherence. For women who had prevented previous exposure to MTCT, the odds of adherence to treatment were 2.5 times higher compared to those who had not been exposed to MTCT before (OR = 2.5, p = 0.005).
23	Cross sectional	Zhong et al, 2020., China	23,879 pregnant women	Pregnant women who have a history of STIs significantly increase the risk of HIV infection (OR 6.63; 95% CI 1.33-32.90) and syphilis (OR 9.06; 95% CI 3.85-21.30), whereas pregnant women who are not married/widowed/divorced are more likely to be infected with HIV (OR 2.81; 95% CI 1.20-6.54) and HCV (OR 58.12; 95% CI, 3.14-1076.99). Furthermore, pregnant women whose husbands have a history of STIs (OR 5.62; 95% CI 1.24-25.38) or drug use (OR 7.36; 95% CI 1.25-43.43) show an increased risk of HIV infection.
24	Studi qualitative	Siregar K.N, 2021., Indonesia	The FGD consisted of 35 participants.	There are no local policies and guidelines for PMTCT programs and services; coverage of HIV testing in pregnant women has not reached 100% according to the target. There are limited human resources in public and private services to carry out the program. Assistance activities to ensure antiretroviral (ARV) adherence are limited, and HIV-positive women face stigma and discrimination, not only from the community but also from health workers.
25	Repport	Wang et al, 2021., China	China's national information system data.	Data from the surveillance system revealed that there was a marked increase in the coverage of HIV screening in pregnant women and the use of antiretroviral drugs for HIV-infected pregnant women and their babies in China from 2011 to 2020.
26	Cross sectional	Oladunni A.A et al , 2021., Nigeria	108 respondents.	Studies reveal that the loss of kinship (father or mother) to AIDS and equal treatment by siblings. HIV positive people are associated with three forms of stigma (internalized stigma, perceived stigma, and experienced stigma) including access to health care and services.
27	RCT (randomized control trial)	Abbamonte et al, 2020., Afrika	Female adult, UK (8-24 weeks positive for HIV and has a partner).	Pregnant women with HIV often experience stigma and verbal abuse from their partners.
28	Cross sectional	Adawiyah Ra, 2021., Indonesia	Quality Service and Delivery Survey (QSIDS), 2016.	The proportion of pregnant women who tested for HIV was $\geq 10\%$ more likely in facilities with higher readiness scores and more trained counselors available, and less likely in facilities located outside Java-Bali and in facilities with more village midwives.

29	Cross sectional	Niama1 Congo	RF, 2017.,	2,979 women.	pregnant	The global HIV infection rate is estimated at 3.6% (95% CI; 3.0-4.4). As expected, HIV prevalence was significantly higher in women aged over 25 years (4.4% (3.4-5.6), p = 0.026) and those attending urban ANC (5.04%, p < 0.01). In addition, women who live in urban areas are more at risk of infection (5.04 VS 2.38, p < 0.01). Positive RPR test in 117 pregnant women (3.92%). The risk of developing syphilis was significantly higher for single women compared to married women (4.4% VS 2.7%; p < 0.01). HIV co-infection and syphilis were also estimated in 22 cases (0.73%).
30	Repport	WHO, 2018	Mother and baby pair in Asia and the Pacific.	This report presents the latest available data on three EMTCT impact and process indicators, highlighting achievements and challenges. By gathering data from across the Asia Pacific region, this report provides a basis for measuring and evaluating progress and helps focus attention on areas that are working well and areas that need improvement.		
31	Cross sectional	Tepe-Mensah et al, 2022., Ghana	412 students.	About 90% (374/412) of the respondents had good knowledge of HIV/AIDS based on the criteria determined by the research, but only 23.3 (96/412) had ever been tested and 66.3% (266/401) were willing to be tested for HIV Now. Respondent's gender, previous sexual relations, and whether parental or non-parental educational support influenced the intention to test for HIV now.		