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EVALUATION OF PREVENTION OF MOTHER TO CHILD TRANSMISSION (PMTCT) IMPLEMENTATION IN YOGYAKARTA, INDONESIA: A 2023 ASSESSMENT

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Abstract: The Prevention of Mother-to-Child Transmission (PMTCT) program is essential for reducing new HIV infections. This study evaluated PMTCT implementation in Yogyakarta, Indonesia, in 2023 using a descriptive qualitative approach and the CIPPO model (Context, Input, Process, Product, Outcome). Data were gathered through interviews with stakeholders from the Provincial and District Health Offices, Community Health Centers, and hospitals. The results showed that PMTCT has been integrated into antenatal care, including HIV testing, referrals, labor management, newborn prophylaxis, breastfeeding support, and follow-up for HIV-positive mothers. Community education efforts helped reduce HIV stigma. However, challenges such as the absence of routine HIV testing in pre-marital medical exams, unplanned pregnancies, and the high mobility of pregnant women hinder case detection and monitoring. While implementation aligns with health regulations, improvements are needed to strengthen collaboration across sectors and with NGOs. This study highlights key areas for enhancing PMTCT services and contributes practical insights for achieving the goal of zero new HIV infections by 2030. Addressing identified barriers and leveraging existing strengths can lead to more comprehensive and equitable HIV prevention strategies in maternal and child health services.

Keyword: adolescents, HIV prevention, pregnant women, PMTCT

Introduction

Human Immunodeficiency Virus (HIV) is an infection that attacks the immune system. In contrast, Acquired Immunodeficiency Syndrome (AIDS) is a collection of symptoms caused by HIV (World Health Organization, 2023). In 2022, global HIV cases in the world increased with the number of cases of 39 million people living with HIV (PLHIV). The Asia Pacific region ranks 2nd compared to other regions with the largest number of cases of people living with HIV, namely 6.5 million. Meanwhile, Indonesia ranks 3rd in the Asia Pacific region after India and Thailand with a total of 540 thousand PLHIV. New cases of infection in Indonesia in 2022 reached 24 thousand (UNAIDS, 2022).

Worldwide, approximately 1.3 million women and girls living with HIV become pregnant each year. Without intervention, the risk of mother-to-child HIV transmission during pregnancy, labor, delivery, or breastfeeding ranges from 15% to 45%. Therefore, promptly identifying HIV infection should be followed by a referral for lifelong treatment and care, ensuring continued engagement in care, viral suppression, and partner services support (World Health Organization, 2024).

Based on data the Yogyakarta Special Region Health Service states that new cases of HIV in 2022 were 830 cases. The accumulation of PLHIV cases until March 2023 reached 7003 cases. The largest proportion is in the 20-29 year age range. The source of HIV transmission is recorded to come from the use of injected narcotics, risky sexual behavior, and blood transfusions. It can also occur during the perinatal and neonatal periods (LSM Victory Plus, 2023).

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Reducing in HIV rates is one of the targeted achievements in the framework of sustainable development of the Sustainable Development Goals (SDGs) on the indicator of a healthy and prosperous life. The SDGs target in 2030 is zero new HIV cases, ending the AIDS epidemic, and other infectious diseases. Efforts to achieve the SDGs target are a national development priority that requires synergy in planning policies at the national level, as well as at the province and the regency/city levels (Kementerian PPN, 2020).

The SDGs targets at the national level refer to the Indonesian Medium-Term Development Plan 2020-2024 in the form of programs, activities, and measurable indicators as well as indications of financial support. HIV AIDS control is one of the indicators that must continue to be continued to achieve the target of reducing HIV incidence per 1000 population in 2024. The major goal was the end of the AIDS epidemic in 2030, can be achieved (Kemenkes RI, 2020).

HIV infection attacks the immune system and makes a person susceptible to all diseases which can lead to death. HIV can be transmitted through the body fluids of an infected person such as blood, breast milk, semen, and vaginal fluids. HIV can also be transmitted from mother to child (World Health Organization, 2023).

HIV cases in children under 13 years old are recorded as 92% due to vertical transmission. Children are infected during the perinatal and neonatal period from HIV-positive mothers. PMTCT is a very effective intervention to prevent this transmission. PMTCT can reduce the rate of vertical transmission from mother to child during pregnancy, labor and breastfeeding (Kemenkes RI, 2019).

The global commitment to eliminating mother-to-child transmission (MTCT) of HIV is reinforced through the integration of prevention efforts into maternal, newborn, child, and adolescent health services, alongside strengthened health systems. Additionally, expanding access to sexual and reproductive health services—including unintended pregnancy prevention and STI screening and treatment for women and girls living with HIV—remains a key focus. This integrated approach has led to the Triple Elimination Initiative, which emphasizes person-centered care while reducing disease incidence, morbidity, and mortality. It also enhances disease monitoring by utilizing strategic data for response planning (World Health Organization, 2024).

Despite the national framework supporting PMTCT implementation, several local challenges persist in Yogyakarta. These include the high mobility of pregnant women, which complicates follow-up and continuity of care; limited psychological support at community health centers due to the absence of dedicated psychologists; and the lack of routine HIV screening in pre-marital medical examinations, which delays early case detection. Additionally, stigma and fear of discrimination remain significant barriers, discouraging some women from accessing services. The target population includes not only pregnant women but also adolescents and women of reproductive age in high-risk groups, such as female sex workers and those with limited access to health information. Reaching these populations requires intensive cross-sectoral collaboration, especially with NGOs and community health cadres who can bridge the gap between formal services and underserved communities. These contextual challenges must be considered in efforts to strengthen PMTCT and achieve zero new HIV infections by 2030.

Although numerous studies have examined the implementation of PMTCT programs globally and in various parts of Indonesia, there is limited documentation specific to Yogyakarta, especially regarding how the PMTCT program is integrated into antenatal care at the regional level. Local contextual factors such as the high mobility of pregnant women, inconsistent HIV screening during pre-marital health exams, limited psychosocial support at Puskesmas, and fragmented cross-sector collaboration have not been comprehensively explored. Additionally, there is a lack of evaluative research that uses a structured framework such as CIPPO to assess not just outcomes, but also inputs, processes, and contextual factors affecting program implementation. This study aims to fill that gap by evaluating the PMTCT program in Yogyakarta in 2023, providing insights into both barriers and opportunities for improving maternal HIV prevention efforts in the region.

This study goals was to: 1) analyze the context, input, process, product, and outcome components of the PMTCT program implementation in Yogyakarta; 2) identify key barriers and challenges that hinder the effective implementation of PMTCT services at different levels of the healthcare system; 3) assess the role of cross-sector collaboration, including NGOs and community health workers, in supporting PMTCT program delivery; 4) evaluate the potential long-term impact of PMTCT interventions on reducing mother-to-child HIV transmission rates in Yogyakarta; and 5) provide evidence-based recommendations for strengthening PMTCT strategies and achieving the SDG target of zero new HIV infections by 2030.

Material and Methods

This qualitative descriptive study employs the CIPPO evaluation model, assessing Context, Input, Process, Product, and Outcome to evaluate PMTCT implementation in Yogyakarta in 2023. The input components of the PMTCT program include human resources, regulations, funding, and methods, all of which play a crucial role in its effectiveness. Process and evaluation were examines all four PMTCT prongs.

Sampling Strategy in this study were selected using purposive sampling, focusing on individuals with direct involvement in the planning, coordination, or implementation of PMTCT services. Key informants included officials from the Provincial and District Health Offices, HIV counselors, midwives, doctors, and representatives from hospitals and NGOs. Inclusion criteria included a minimum of one year of experience in PMTCT-related services and availability during the data collection period. The diversity of roles aimed to ensure a comprehensive understanding of the program across different levels of the health system. Data collection involved interviews with key stakeholders, including Health Department officials, HIV counselors, and healthcare workers at hospitals and community health centers. The study examines all four PMTCT prongs: (1) preventing HIV in women of childbearing age, (2) preventing unintended pregnancies in HIV-positive women, (3) preventing mother-to-child HIV transmission, and (4) providing treatment and support for HIV-positive mothers and children.

The data analysis uses descriptive analysis, which involves summarizing and interpreting the findings to provide a clear picture of the effectiveness, challenges, and gaps in PMTCT implementation. This

approach helps assess whether the program aligns with national policies and global HIV prevention goals. All interviews were transcribed verbatim and analyzed using thematic content analysis. The analysis process involved: (1) familiarization with the data through repeated reading of transcripts; (2) coding relevant statements and organizing them into categories aligned with the CIPPO framework; (3) identifying emerging themes, particularly related to implementation challenges and stakeholder roles; and (4) triangulating findings across data sources to enhance credibility. Manual coding was performed, and themes were reviewed collaboratively by the research team to reduce bias and ensure consistency. Ethical approval was obtained under clearance number DP.04.03/e-KEPK.1/818/2023, with informed consent and assent secured to uphold voluntary participation and participant rights.

Result

Input: Human Resources for PMTCT

PMTCT is defined as an intervention to prevent HIV infection from mother to baby. PMTCT efforts are implemented through comprehensive and continuous HIV prevention and handling activities in four components (prongs) of the approach (Kemenkes RI, 2015). The implementation of PMTCT in DIY began in 2010 at the provincial level and was followed by all districts/cities, according to the following informant's statement:

> *"Since 2010, PMTCT has been implemented across all regencies and cities in Yogyakarta following the first detected HIV cases in pregnant women. However, at that time, the number of identified cases remained low due to limited HIV screening efforts compared to the more extensive testing conducted today. To strengthen PMTCT implementation, the Provincial Health Office has provided training for healthcare workers at community health centers and hospitals. In addition to training, technical guidance and workshops have also been conducted to enhance knowledge and improve service delivery." (Informant 01, Yogyakarta Province Health Department)*

PMTCT implementation is supported by a regency/city-level team, appointed by an official decree. This team includes HIV counselors, surveillance officers, and trained health professionals such as doctors, midwives, nurses, lab technicians, and pharmacists. However, psychologists are only available in hospitals, limiting psychological support at community health centers (Puskesmas) for pregnant women with HIV. The following is a statement from an informant:

> *"All health facilities in Kulon Progo provide supportive care and treatment services, including trained human resources to support PMTCT implementation. However, psychologists are not available at community health centers (Puskesmas) and are only stationed in hospitals. If a pregnant woman tests positive or reactive for HIV, she is referred to the hospital for further evaluation, counseling, and treatment." (Informant 02, Kulon Progo Regency Health Department).*

Cross-sectoral collaboration and partnerships with NGOs play a crucial role in efforts to reduce HIV cases through the PMTCT program. NGOs serve as key supporting resources, assisting in program implementation by providing advocacy, education, and outreach services.

> *"...related to cross-sector and NGOs strongly support and encourage programs to reach more people." (Informant 04, Sleman Regency Health Department)*

At the hospital level, specialist doctors are involved in the HIV team.

> *"The hospital does not have a dedicated PMTCT team; instead, an HIV team manages care, consisting of doctors, nurses, counselors, internal medicine specialists, obstetricians, pediatricians, and midwives."(Informant 05, Health worker at Hospital)*

Input: PMTCT Service Regulation/ Material

Each regency/city has an SOP for HIV case detection in pregnant women through triple elimination services in Integrated Antenatal Care (ANC). DIY Governor Regulation No. 27/2019 mandates triple elimination in ANC across all health services. The maternal-neonatal referral manual guides the referral of HIV-positive pregnant women to hospitals for further care.

> *"Standard Operating Procedures (SOP) for detecting HIV cases already exist in each health service facility and are regulated by each health service." (Informant 06, Yogyakarta Regency Health Department)*

> *"Standard Operating Procedures (SOP) of integrated ANC, reproductive health, adolescent anemia and Adolescent Health Care Services are available at health facilities, including referral manuals for emergency cases." (Informant 02, Kulon Progo Regency Health Department).*

Regulations on infectious diseases, including HIV, already exist, but specific PMTCT regulations at the regency/city level are still lacking. Currently, these regulations are in the planning and drafting stages to strengthen PMTCT implementation. The following are insights from informant interviews:

> *"There are no special or existing regulations for PMTCT, but implied in the Regent's Regulation about the reduction of Maternal Mortality Rate and Infant Mortality Rate strategy." (Informant 07, Bantul Regency Health Department.)*

> *"Regulations related to HIV and PMTCT are being prepared, planned to be issued in 2025." (Informant 02, Kulon Progo Regency Health Department).*

The provision of medications, reagents, and consumables for PMTCT follows established guidelines. While Standard Operating Procedures (SOPs) cover planning, procurement, storage, distribution, disposal, and documentation, they apply broadly to healthcare supplies rather than being PMTCT-specific. The following are insights from informant

> *"SOPs for pharmaceutical supplies in PMTCT exist but are general, not HIV-specific. The processes for planning, procurement, storage, and distribution follow the same SOPs as non-communicable disease programs."(Informant 03, Gunung Kidul Regency Health Department).*

Input: PMTCT Funding/ Money

The national government funds the procurement of reagents and antiretroviral (ARV) drugs through a central budget. If national stock shortages occur, the local government provides additional funding to maintain supply. Meanwhile, the Global Fund supports capacity building, including training and professional development for healthcare providers in PMTCT services. The following is a statement from an informant:

> *"PMTCT funding comes from three sources: national government budget, local government budget, and Global Fund, with no overlap between them. Global Fund support is coordinated exclusively with provincial health offices." (Informant 04, Sleman Regency Health Department)*

Input: PMTCT Methods

PMTCT in Yogyakarta is implemented through HIV screening for pregnant women, integrated with antenatal care (ANC) services. If a woman tests HIV positive, she is referred to a hospital for further care. Delivery takes place in a hospital, newborns receive prophylaxis, and breastfeeding assistance, monitoring, and supervision are provided for HIV-positive mothers. The following is a statement from an informant:

> *"Integrated ANC is implemented in all health centers, with an achievement rate of over 90%. However, the private sector has not yet adopted triple elimination, as PMTCT logistics are only distributed to health centers. To bridge this gap, health centers collaborate with private providers by referring pregnant women for integrated ANC services. Hospitals, in turn, handle referrals of HIV-positive cases from health centers." (Informant 02, Kulon Progo Regency Health Department).*

Integrated ANC, which includes triple elimination screening for HIV, hepatitis, and syphilis, has been effective in detecting HIV cases. HIV-positive pregnant women are referred for delivery in hospitals to ensure proper care and management. The following is a statement from an informant:

> *"In integrated ANC screenings at health centers, if a pregnant woman tests HIV positive, she is referred to the Regional General Hospital (RSUD) as per the referral manual. A team of experts then determines whether treatment should continue at the hospital or be managed at the health center. Delivery is conducted in hospitals to ensure proper preventive measures for newborns. HIV patients with severe conditions are immediately referred to Dr. Sardjito Regional General Hospital for advanced care." (Informant 03, Gunung Kidul Regency Health Department).*

Process: PMTCT Service in Yogyakarta

The implementation of the PMTCT program consists of 4 prongs which in this discussion are referred to as prongs 1 to 4, including the following:

1. Prong 1: Prevention of HIV transmission in women of reproductive age

PMTCT Prong 1 activities in Yogyakarta focus on reproductive health education in schools, campuses, and key populations. These efforts aim to equip adolescents with knowledge to avoid risky behaviors, reducing the risk of HIV transmission among women of reproductive age.

> *"Reproductive health counseling is provided, particularly for adolescents in schools. Socialization and education programs ensure students receive information to help them avoid risky behaviors that could lead to HIV and other STI transmission." (Informant 04, Sleman Regency Health Department).*

> *"Teen-focused programs are conducted annually, especially during school or student orientation, in collaboration with NGOs. Health promotion is supported through leaflets, social media, and digital applications." (Informant 06, Yogyakarta Regency Health Department).*

2. Prong 2: Prevention of unintended pregnancy in women with HIV

PMTCT Prong 2 activities include health check-ups and education on reproductive health and pregnancy for prospective brides and grooms. However, HIV screening is not yet integrated into the PMTCT program and is only conducted when medically indicated. In several districts/cities, screening is not universally implemented but is limited to those registering their marriage through the religious affairs office. The following is a statement from an informant:

> *"Prospective brides and grooms are required to undergo hemoglobin testing and pregnancy tests at health centers, but HIV testing is not mandatory. Health examinations are available for individuals of all religious backgrounds. However, HIV testing is only offered to those at risk as an optional service, requiring out-of-pocket payment, whereas integrated ANC services are fully covered by the government."(Informant 02, Kulon Progo Regency Health Department).*

> *"I hope the PMTCT target will be expanded, not only to key populations (pregnant women), but also to adolescents and prospective brides to be provided with HIV screening facilities."(Informant 07, Bantul Regency Health Department).*

HIV screening for prospective brides and grooms is essential to enable unplanned pregnancy prevention for individuals living with HIV. Planned pregnancies allow HIV-positive women to conceive under optimal conditions, reducing the risk of mother-to-child transmission. Meanwhile, family planning services for HIV-positive mothers are available at health centers, including the provision of free

condoms. For long-term contraceptive methods, services are referred to hospitals for further management.

The following is a statement from an informant:

> *"Family planning services for HIV patients include the provision of free condoms at health centers. For other contraceptive methods, patients are referred to hospitals in accordance with established guidelines." (Informant 04, Sleman Regency Health Department)*

> *"Family planning services for HIV-positive mothers are available at all health facilities in Yogyakarta City. Patients are encouraged to use long-term contraceptive methods, which are provided at hospitals. At health centers, IUD insertion and IVA screenings have been introduced but are still in the socialization phase."(Informan 01, Yogyakarta Province Health Department)*

HIV screening for key populations is carried out through cross-sector collaboration, including partnerships with NGOs that help reach target groups in the community. This approach has been implemented in Yogyakarta City. The following insights were gathered from interviews:

> *"Health centers near localized areas serve a high number of Female Sex Workers (FSWs), a key population for HIV screening. During mobile visits, many FSWs tested positive for STIs, prompting the establishment of an MOU with relevant regions and cross-sector collaboration. As part of this effort, FSWs are required to undergo triple elimination screening at least once at the health center. NGOs play a crucial role in facilitating their access to these services."(Informant 08, Health worker at Sleman Health Centre)*

3. Prong 3: Prevention of transmission of HIV and syphilis from pregnant women (with HIV and syphilis) to the fetus/baby.

The most effective way to prevent vertical HIV transmission is by reducing the viral load in the mother's blood. All pregnant women with HIV should receive ARV therapy, regardless of their CD4 count. The following is a statement from an informant regarding ARV implementation in Yogyakarta:

> *"ARV therapy is routinely provided to pregnant women with HIV, with midwives responsible for monitoring adherence. If a patient misses or discontinues medication, the assigned midwife ensures follow-up and adherence. Delivery takes place in hospitals to facilitate preventive prophylaxis for newborns, following established procedures."(Informant 03, Gunung Kidul Regency Health Department).*

Pregnant women with HIV are referred to hospitals for management and delivery. Additionally, support is provided for breastfeeding assistance, and ARV prophylaxis is administered to newborns. The following are insights from informant interviews:

"Childbirth for mothers with HIV follows the PMTCT SOP and is conducted at hospitals in each regency. However, if a hospital lacks the necessary capabilities, the case may be referred to Dr. Sardjito General Hospital."(Informant 04, Sleman Regency Health Department)

"Not all hospitals can conduct viral load and CD-4 tests, so patients requiring these tests are referred to Dr. Sardjito General Hospital. To reduce the risk of transmission, mothers receive support in providing formula milk as a substitute for breast milk, as exclusive breastfeeding poses a high risk of infection." (Informant 05, Health worker at Hospital)

"Breastfeeding support is provided for infants born to HIV-positive mothers. In Sleman Regency, the formula milk program is available for underprivileged HIV patients and victims of violence, funded through the health center capitation fund."(Informant 08, Health worker at Sleman Health Centre)

4. Prong 4: Psychological, social and care support for mothers with HIV, their children and families

Pregnant women with HIV receive monitoring and supervision from the PMTCT team at the health center. With the patient's consent, trained community health cadres may also be involved in the support process. The following are insights from the interview:

"If a reactive diagnosis is confirmed, the health center team—comprising psychologists, nurses, midwives, and doctors—provides ongoing support through routine monitoring and home visits."(Informant 04, Sleman Regency Health Department)

"…If the HIV status is positive, trained cadres can provide support, but only with the patient's consent regarding who may be informed."(Informant 07, Bantul Regency Health Department)

"Discrimination and negative stigma against HIV survivors still exist in the community, from health workers, it is no longer there. The number of survivors of discrimination and stigma is decreasing regularly with the provision of socialization about HIV when providing counseling in the community."(Informant 06, Yogyakarta Regency Health Department).

Continuous monitoring and supervision by the PMTCT team at the health center are consistently implemented. The following is a statement from an informant:

"If a pregnant mother is HIV-positive, she is referred to the hospital for delivery, newborn care, and family planning services. The health center continues to monitor the mother's treatment, infant feeding practices (whether mixed feeding is used), and the child's health for any HIV-related symptoms. So far, infants born to HIV-positive mothers have been given formula milk instead of breast milk." (Informant 08, Health worker at Sleman Health Centre).

Evaluation of Program Implementation and Barriers to PMTCT Services

The implementation of PMTCT aligns with existing regulations but still requires improvement. The program's human resources are adequate, and coordination and evaluation are conducted every three months. Collaboration with NGOs and cross-sector partnerships enhances efforts to reach key populations.

> *"It is necessary to improve coordination not only at the district/city level, but also at the provincial or central level, which can be in the form of updating the reporting system or updating knowledge. (Informant 03, Gunung Kidul Regency Health Department).*

> *"Collaboration with social services, education, and tourism departments continues to expand to reach key populations. For example, the tourism department conducts mobile visits to hotels, the education department engages with schools, and social services assist underserved communities. Additionally, the health department has multiple MOUs with NGOs such as Victory Plus." (Informant 04, Sleman Regency Health Department).*

Obstacles in PMTCT implementation include incomplete screening of pregnant women due to high community mobility and unreported unwanted pregnancies. To address this, health cadres are needed to assist in identifying and reaching these pregnant women.

> *"Implementation is challenged by high community mobility and the prevalence of hidden unwanted pregnancies, preventing integrated ANC services from achieving full coverage." (Informant 04, Sleman Regency Health Department).*

> *"All pregnant women are identified through cadres. Those who avoid health center check-ups are tracked by local pregnancy cadres, while trained cadres provide support for cases of unwanted pregnancies." (Informant 03, Gunung Kidul Regency Health Department).*

To enhance ANC service coverage, the Health Center disseminates information to pregnant women with the support of cadres. However, synchronization of ANC data reports still requires improvement, as stated by one of the informants:

> *"In some cases, pregnant women have undergone HBsAg testing outside the health center, resulting in incomplete triple elimination screening and data discrepancies. Medical record entry (SIHA) should be performed by the attending officer on the same day, with monthly reporting managed by the coordinating midwife. However, a lack of internal coordination within the health center leads to data inconsistencies, emphasizing the need for better data integration before submission to the health office." (Informant 07, Bantul Regency Health Department)*

ARV stockouts also occur when supplies approach their expiration date, rendering them unusable. This issue was highlighted by an informant from the pharmacy section of the health service as follows:

"Reagents have never been out of stock as they are supplied by the provincial health office. However, ARV drug shortages have occurred due to stock expiring, as the drugs were initially delivered with a nearing expiration date."Informant 08, Yogyakarta Regency Health Department)

"ARV stockouts often occur due to expiration, as the expiration date and distribution time are typically only three months apart. While this does not happen every year, regulatory flexibility in drug procurement is needed to address stock shortages."Informant 09, Bantul Regency Health Department)

Assistance for HIV patients is sometimes not optimal due to a lack of cooperation, possibly driven by concerns about societal stigma. To address this, community education on HIV is also conducted.

"…unfortunately not all HIV patients are cooperative."(Informant 06, Yogyakarta Regency Health Department)

"Efforts to reduce stigma in the community include public education and awareness campaigns through health centers, NGOs, and community cadres. Additionally, local village governments are engaged in HIV-related activities to enhance understanding. Collaboration with the education office ensures HIV education is integrated into the curriculum, with parental involvement encouraged. These initiatives stem from past cases where children living with HIV faced rejection, prompting plans to establish a dedicated shelter for PLWHA." (Informant 07, Bantul Regency Health Department)

The implementation of PMTCT has been carried out across input, process, and output stages, despite encountering some challenges. Therefore, further efforts are needed to achieve the target of reducing new HIV cases and ultimately eliminating HIV in line with the SDGs target for 2030. The key findings from the analysis are summarized in the table

Table 1. PMTCT Program Evaluation in Yogyakarta 2023

Item Evaluasi	**Result**
Input	
Man	All healthcare facilities capable of managing HIV-positive patients have the necessary human resources to support PMTCT services. However, some districts still lack psychologists, as they are only available in hospitals.
Money	Local government Fund, National government fund, and also Global Fund as international funding.

Material	Regulations in the form of team decrees and SOPs for PMTCT services are available. Provincial and district regulations (Pergub/Perbup) primarily focus on reducing maternal and infant mortality rates (MMR and IMR) and HIV, with PMTCT included within these policies, though not as a standalone regulation.
Methods	1. Integrated ANC has been implemented in all Health Centers, requiring every pregnant woman to contact the Health Center and undergo triple elimination screening. 2. Some HIV services have not yet implemented treatment, so further treatment is provided at Referral Hospitals.
Compliance between plans/regulations and established programs	The need for periodic PMTCT refresher/training to improve the skills and self-efficacy of officers.
Process	
Prong 1	Reproductive health education for adolescents has been implemented using existing health promotion media in schools, campuses and key populations.
Prong 2	Screening of prospective brides and grooms has been carried out if there are indications and is only carried out on marriages registered in the Religious Affairs Office. Family planning services have been provided for mothers with HIV at the Health Center, the availability of free condoms and the existence of long-term family planning services at the hospital.
Prong 3	Handling of HIV mothers for childbirth involves referral to the hospital to receive newborn prophylaxis and assistance in providing breast milk/baby formula..
Prong 4	Pregnant women with HIV are monitored and supervised by a team at the Community Health Center and trained cadres with the consent of the pregnant woman.

Evaluation	
Prong 1	There is a need to increase cross-sector collaboration in efforts to implement HIV prevention among adolescents
Prong 2	The new integrated Caten efforts have been implemented with HBSAg screening, not including triple elimination (HIV, syphilis) and have only been in collaboration with the Religious Affairs Office (for Muslims).
Prong 3	Integrated ANC has been implemented. Most delivery assistance is still carried out in vertical hospitals, especially for BBL prophylaxis. There is a policy of providing formula milk assistance at the Sleman Health Center, but this does not exist in other areas.
Prong 4	Mentoring has been going well even though there are still obstacles with the problem of stopping medication and monitoring due to moving places/regions.
Output	
HIV Screening for pregnant women	The suboptimal synchronization of screening data for triple elimination requires further policies and coordination regarding this reporting system.
Screening result documentation	The suboptimal synchronization of screening data for triple elimination requires further policies and coordination regarding this reporting system.
Reagen and ARV	Stockouts of reagents and ARVs still occur due to dropping close to the Expired date so that they become unusable.
Stigma dan Discrimination	The low participation of HIV sufferers may be due to the ongoing stigma and discrimination they face. Therefore, continued efforts to educate the community about HIV are essential to reducing stigma and discrimination.

The integration of PMTCT into antenatal care services, as highlighted in this study, offers a practical framework for improving early HIV detection and prevention among pregnant women. These insights can support local governments and healthcare providers in developing targeted interventions, such as mandatory HIV screening during the first ANC visit, enhanced midwife training in HIV counseling, and better coordination between health centers and community-based organizations. By translating these findings into policy and practice, Indonesia can accelerate progress toward achieving the Sustainable Development Goal (SDG) target of zero new HIV infections by 2030.

Discussion

This study assessing Context, Input, Process, Product, and Outcome to evaluate PMTCT implementation in Yogyakarta 2023. Input for PMTCT devided in to Human Resources, Regulation, Funding and Methods as important in PMTCT program. Modifiable factors at the facility level can influence the effectiveness of PMTCT service delivery. Key factors such as staffing availability, access to essential supplies, population size, NGO involvement, and proximity to reference laboratories may impact PMTCT cascade outcomes. Targeted program strategies addressing these factors can help enhance PMTCT performance and service effectiveness (Dinis et al., 2022).

Although trained healthcare workers are available across PMTCT service points, the lack of psychological support at community health centers is rooted in broader human resource allocation policies, which prioritize physical health services over mental health in primary care settings including counselling session. Psychologists are often centralized at hospitals, leaving public health center without capacity to address the emotional and psychological needs of HIV-positive mothers—a critical gap, as mental health directly impacts treatment adherence and quality of life (Gouse et al., 2017).

Cross-sectoral collaboration and partnerships with NGOs play a crucial role in efforts to reduce HIV cases through the PMTCT program. NGOs serve as key supporting resources, assisting in program implementation by providing advocacy, education, and outreach services. Their primary role in addressing HIV/AIDS is to engage and support key populations within the community, ensuring better access to prevention, testing, treatment, and care services (Yoku et al., 2020).

Integrated ANC that includes triple elimination services, namely HIV, hepatitis, and syphilis examinations, has proven effective in detecting HIV cases. Delivery of pregnant women with HIV is carried out in hospitals. Delivery in hospitals can also increase the achievement of ARV prophylaxis in newborns because of the complete facilities and the availability of pediatricians who are part of the PMTCT team in the hospital (Ambelina et al., 2019). The high mobility of pregnant women, particularly those in informal employment or from rural areas, disrupts continuity of care and follow-up testing (Lori et al., 2017). These women may initiate ANC in one district and give birth in another, leading to incomplete data records and gaps in prophylaxis coverage for their newborns. Stigma also remains a significant barrier—while healthcare workers have largely adopted non-discriminatory practices, many patients still fear disclosure and avoid engaging in regular care (Dirisu et al., 2020).

One of the persistent gaps in the implementation of PMTCT in Yogyakarta is the lack of routine HIV screening in pre-marital health examinations. This gap is largely due to policy limitations, with current regulations focusing only on specific at-risk groups and lacking enforcement across all religious and civil registration systems. As a result, early case detection is missed, especially among newlyweds who may be unaware of their HIV status, undermining efforts to prevent unintended pregnancies in HIV-positive individuals (Saidon, 2019). To overcome these challenges, policy adjustments are needed to make pre-marital HIV testing a standardized part of all health exams, with support from both health and religious institutions. Additionally, digital health tracking systems could help maintain patient records across districts, ensuring continuity of care despite mobility. To reduce stigma, community-led

campaigns involving HIV survivors, peer educators, and local leaders could help normalize HIV testing and treatment, especially in high-risk and conservative communities.

The availability of reproductive health information systems for adolescents is very helpful in increasing adolescent knowledge and self-efficacy about reproductive health. Previous research has shown that health information systems for adolescents that have proven effective in developing countries are information system models that focus on adolescent prevention efforts in avoiding risky behavior. (Choliq et al., 2022) This is supported by the statement of one informant that the implementation of socialization and education in schools is carried out so that teenagers are exposed to information to avoid risky behavior. One of the activities is a meeting and monitoring of adolescent health in order to increase adolescent knowledge about reproductive health, mental health, and drug abuse. Through counseling and joint discussions, there are differences in the level of adolescent knowledge before and after adolescent health counseling. However, the sustainability of this activity also depends on the support and interest of the adolescents themselves (Anggraeni & Sutarno, 2023). This statement is supported by a literature study which states that the coverage of the use of adolescent health care services in each region in Indonesia is still <50%.(Muhammad Salman Ali Muzaky & Arifah, 2022).

Key HIV populations, namely FSW, injecting drug users (IDUs), and men who have sex with men (MSM), are targeted for HIV screening because they are vulnerable to HIV transmission. Efforts to reduce HIV cases and control HIV cases in key populations require commitment and willingness from these populations so that any obstacles that may occur in the group can be overcome (Witzel et al., 2020).

The most effective method to prevent vertical transmission of HIV is to reduce the amount of HIV virus in the mother's blood. All pregnant women with HIV infection should be given ARV therapy regardless of CD-4 count. Pregnancy itself is an indication of continued ARV therapy for life (Kemenkes RI, 2019). The PMTCT program reduces the rate of vertical HIV transmission. However, there are several factors that are suspected of increasing the risk of vertical HIV transmission, namely giving birth outside of a health facility (OR: 6.00, 95% CI), low parental knowledge (OR: 5.95, 95% CI), late provision of newborn prophylaxis (OR: 4.89, 95% CI), mixed-breastfeeding (OR: 10.36, 95% CI), and not being given cotrimoxazole therapy (OR: 7.56, 95% CI). Pregnant women with HIV who do not give birth in a health facility that is able to serve deliveries with HIV have a risk of unsafe delivery. Babies also do not receive immediate prophylaxis and other preventive measures that can be taken to reduce the risk of HIV transmission. Meanwhile, babies who are not given prophylaxis have a 5 times greater risk of contracting HIV.(Dong et al., 2020; Hussen et al., 2022).

Continuity of care is needed for mothers with HIV, especially pregnant women, related to the hope of continuing comprehensive ARV therapy and the negative stigma in society. Assistance is expected to reduce psychological and social pressure that may arise. However, the DIY Health Office has made efforts to provide education to the community about HIV so that discrimination and negative stigma are decreasing according to informants' statements. A qualitative study on assistance for pregnant women by an NGO also stated that pregnant women who are HIV positive feel happy when given assistance.

However, the bad attitude of the companion can also be a reason to stop treatment (Suryanti & Nerta, 2020).

Family involvement in caring for mothers with HIV is also important because family support has been shown to be related to adherence to ARV treatment (p-value 0.029) (Setyarini & Suprapti, 2016). Health cadres are part of the community that is very closely related to the success of a health program in the community. A study stated that cadres play an important role in increasing knowledge, attitudes, and perceptions of pregnant women regarding ANC services. Knowledge (p-value = 0.000), individual assessment (p-value = 0.001), belief value (p-value = 0.001), family support (p-value = 0.001), perception of benefits (p-value = 0.001), and perception of barriers (p-value = 0.000) are related to the utilization of antenatal care services by pregnant women (Primastuti, 2022).

Conclusion

The study concluded that the PMTCT program is well-established, with strong health worker coordination and existing regulations. However, challenges include inconsistent data synchronization, a shortage of psychologists, and incomplete HIV screening for pre-marital couples. Opportunities lie in cross-sectoral collaboration, increased community education, and expanded screening efforts. Threats include stigma, discrimination, patient non-compliance, and stockout issues.

Based on the evaluation results, the following conclusions and recommendations were obtained: 1) The PMTCT team must enhance internal coordination for accurate reporting and data synchronization with the Health Office, alongside periodic capacity-building efforts; 2) Specific PMTCT regulations should be established at the provincial/regency/city level, including drug, reagent, and consumable provisions, with flexible procurement policies to prevent stockouts; 3) Pre marital HIV screening should be prioritized to aid early case detection and prevent unplanned pregnancies among HIV-positive individuals; 4) Mandatory HIV screening for premarital should be implemented through comprehensive cooperation between health centers and local authorities, regardless of religion and 5) Strengthened cross-sector collaboration with social, education, and tourism services, as well as NGOs, is essential to expanding PMTCT outreach and achieving the 2030 zero HIV target.

Future research should explore the long-term impact of PMTCT interventions through longitudinal studies to assess outcomes for both mothers and children. In addition, community-focused studies are needed to understand how local leaders, peer networks, and family dynamics can help reduce stigma and improve adherence to treatment. Given the high mobility of the target population, especially among underserved groups, innovative strategies such as mobile health outreach, digital tracking systems, and community surveillance models should be evaluated to enhance follow-up and service delivery.

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Declaration Conflict of interest statement

The authors confirm that there are no significant financial, professional, or personal conflicts of interest that could have influenced the conduct or presentation of this study.

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