

Implementation the triple elimination program in Cilacap Regency, Indonesia: A sequential exploratory mixed- method study of supporting and hindering factors

Johariyah^{1*}, Evy Apriani², Putri Maretyara Saptiyani¹

¹Department of Midwery, Faculty of Health Sciences, Universitas Al-Irsyad Cilacap, Indonesia

²Department of Nursing, Faculty of Health Sciences, Universitas Al-Irsyad Cilacap, Indonesia
Jalan Cerme No 24 Sidanegara, Cilacap, Jawa Tengah, Indonesia

*Corresponding author : Johariyah2022@gmail.com

ABSTRACT

Background: Sexually transmitted infections, HIV, and viral hepatitis contribute substantially to global morbidity and mortality, causing approximately 2.3 million deaths annually. Integrated screening for HIV, syphilis, and hepatitis B is crucial because these infections share similar transmission routes and pose significant risks of mother-to-child transmission. In the absence of intervention, the transmission risk ranges from 20–45% for HIV, 69–80% for syphilis, and over 90% for hepatitis B. Indonesia introduced the Prevention of Mother-to-Child Transmission (PMTCT) program in 2007 and subsequently adopted the Triple Elimination strategy. The risk of transmission from mother to child for HIV/AIDS is 20%-45%, for Syphilis is 69-80%, and for Hepatitis B is more than 90%. The transmission of these three diseases occurs thru sexual contact and blood.

Objectives This study evaluated the implementation of the Triple Elimination program in Cilacap Regency, Indonesia, and identified factors supporting and hindering its implementation. To evaluate the implementation of the Triple Elimination program in Cilacap Regency

Methods: Actually, the study closely resembles a sequential explanatory mixed-methods design because the quantitative phase is conducted first, followed by interviews that help explain the quantitative findings. Quantitative study as the initial phase, followed by qualitative study. Data analysis in the quantitative research is conducted through descriptive analysis, while qualitative research employs thematic analysis.

Results: The highest coverage of hepatitis screening was 88.05%, the lowest was 32.34%, with an average coverage of 61.85%, and an average of 0.59% reactive cases. For HIV screening, the coverage was 88.05%, 23,15%, 59.81%, and 0. For syphilis screening, the coverage was 88.05%, 23,07%, 59.81%, and 0.06%. Supporting factors for program implementation include government programs, innovative coverage improvement programs, and programs integrated with ANC.

Conclusions: The implementation of the triple elimination program in Cilacap district has been carried out, but it still needs to be improved.

KEYWORD: *hepatitis; HIV; pregnancy; syphilis; triple elimination*

Article info : Received 08 February 2026; 1st revision 12 June 2026; 2nd revision 16 July 2026; accepted 07 August 2026; available online 31 August 2026; published 30 September 2026

INTRODUCTION

Each year, 2.3 million people die from HIV, STIs, and sexually transmitted infections. This is responsible for 4% of all deaths globally and 14% of deaths from cancer, digestive disorders, and infectious and parasitic diseases (1). High morbidity and mortality can result from infected mothers passing on syphilis, hepatitis B, and HIV to their offspring. Simple and efficient measures to stop the spread of these infections include vaccination, treatment, antenatal screening, and avoiding unintended pregnancies (2). The percentage of people with HIV/AIDS found in the population groups are: Female Sex Workers 3.3%, Homosexuals 27.7%, Transgender Individuals 1.1%, Injecting Drug Users 0.5%, Prison Inmates 0.8%, TB Patients 12.4%, STI Patients 0.9%, and Pregnant Women 16.1% (3). Triple Elimination is an effort to prevent mother-to-child transmission of three infections commonly occurring in low- and middle-income countries: human immunodeficiency virus (HIV), syphilis, and hepatitis B virus (4). The reason for the combined examination of these three diseases is: they have the same pattern and both have high mortality and morbidity risks (5). High morbidity and mortality can result from infected mothers passing on syphilis,

hepatitis B, and HIV to their offspring. Simple and efficient measures to stop the spread of these infections include vaccination, treatment, antenatal screening, and avoiding unintended pregnancies (6)(7). Maternal HIV positive status greatly affects the biological and social outcomes for the baby. Biologically, a baby born without HIV intervention will be infected from the mother during the fetal period at a rate of 15-45%. Socially, a child born with HIV will face difficulties in accessing education and healthcare services (8).

Hepatitis during pregnancy has been linked to an increased risk of gestational diabetes, prematurity, preeclampsia, and eclampsia, according to the analysis's findings. Programs for HB screening, care, and treatment should therefore be put in place during pregnancy (9). The hepatitis B virus does not cross the placenta and cannot infect the fetus unless there is damage to the maternal-fetal barrier. Perinatal transmission accounts for more than 50% of cases worldwide. Pregnant women with chronic hepatitis B and positive hepatitis B virus E antigen (HBsAg) have a 90% chance that their newborns will be infected with the hepatitis B virus (10).

The second most common cause of fetal death worldwide is syphilis, which is a significant contributor to infant morbidity

(11). Syphilis infection that does not receive treatment during pregnancy can increase the risk of premature birth, low birth weight, fetal and neonatal death, and congenital syphilis (12). Syphilis infection during pregnancy remains a serious public health problem worldwide, especially in Indonesia. If a woman is at risk for syphilis, prenatal syphilis screening or early detection is recommended at the first prenatal appointment and again at 32–36 weeks of gestation. Syphilis testing should be performed on every mother who gives birth to a stillborn child after 20 weeks of gestation(13). The incidence of congenital syphilis from 2012 to 2021 increased drastically by 75% in the United States (14). The prevention of congenital syphilis depends on screening during pregnancy. The administration of penicillin during pregnancy has been proven to improve infant outcomes, so syphilis screening should be conducted early in pregnancy (15). Considering the significant morbidity of these conditions, the triple elimination program for HIV, syphilis, and HBV has been identified by the WHO as a global public health priority (16). WHO targets by 2030: no new HIV infections in infants and young children, ≤ 50 cases of syphilis per 100,000 live births in 80% of countries, and a 95% reduction in the incidence of chronic HBV infections.

The target for achieving triple elimination is $\geq 95\%$, $\geq 95\%$, $\geq 90\%$ (WHO, 2023). The triple elimination program in

Indonesia was established starting in 2022. Early detection is carried out at least once during pregnancy, as an effort to reduce the transmission of HIV, Syphilis, and Hepatitis B from mother to fetus. In its implementation, the district/city local government has the obligation to: create and implement programs, provide technical guidance, distribute medicines and tools, enhance the capacity of implementing resources, and evaluate the status of transmission elimination (18).

The coverage of early detection and management of HIV, syphilis, and hepatitis in Indonesia is still below the WHO target. Improving screening during antenatal care is key to preventing transmission from mother to fetus. The use of rapid diagnostic tests, particularly the dual HIV-syphilis test for early detection, has a fairly high accuracy and is easily accessible, making it practically usable (Wardiana et al., 2022). Finding out the supporting and inhibiting factors regarding the implementation of programs expected to reduce the incidence of HIV, Hepatitis, and syphilis transmission is very important, in order to help the government improve the coverage targets expected by the Indonesian Government.

The number of HIV/AIDS cases in Cilacap Regency from 2006 to 2024 reached 2,304 cases, with the majority of patients being of productive age. The implementation of triple elimination is carried out in 38 community health centers throughout Cilacap Regency, integrated

with antenatal care (Dinas Kesehatan Kabupaten Cilacap, 2023). This research aims to evaluate the coverage of the triple elimination check in the Cilacap district region.

MATERIALS AND METHODS

The research design used is the sequential exploratory mixed method. This research was conducted with a quantitative study as the initial phase, followed by a qualitative study. The qualitative study aims to strengthen the findings from the quantitative study conducted in the previous phase. The first phase of the quantitative research aims to determine the coverage of the Triple Elimination examination at the Cilacap District Health Center in 2023, while the second phase involves identifying the factors that hinder and support the implementation of the Triple Elimination program at the Cilacap District Health Center.

The data for this research were collected from January to December 2023. This study was conducted in all health centers in the Cilacap region, totaling 38 health centers, using total sampling technique. For the qualitative study, it involved midwives responsible for the triple elimination program in 5 health centers with the highest coverage and 5 health centers with the lowest coverage through in-depth interviews about the supporting and hindering factors for achieving triple elimination, with sample selection using

purposive sampling technique, with the criteria: as the person in charge of the triple elimination program for at least 1 year. Data analysis in quantitative research is conducted through descriptive analysis with the presentation of frequency distribution of Triple Elimination examination coverage, which consists of: average coverage, highest and lowest coverage. Meanwhile, for qualitative research, thematic analysis is conducted on the supporting and inhibiting factors of the Triple Elimination program implementation. Data presentation in this study is done through tables and graphs of frequency distribution of Triple Elimination examination achievements for quantitative research, while for qualitative research, it is done through the presentation of themes and narratives that support those themes. This research has passed the ethical review with No. 969/280/03/6.1 issued by the Health Research Ethics Committee of the Research and Community Service Institute of Universitas Al-Irsyad Cilacap on March 28, 2024.

RESULTS AND DISCUSSION

Overview of Triple Elimination Examination Achievements in the Cilacap District

Overview of Hepatitis Screening Coverage at Community Health Centers in the Cilacap District. The overview of hepatitis screening coverage at the Community Health Center in the Cilacap District can be seen in the **Table 1**.

Table 1. Overview of hepatitis screening coverage at Community Health Centers in the Cilacap District

Community Health Centers	Scope (%)	Reactive results (%)
Highest Coverage		
Dayeuh Luhur II	88.05	0
Dayeuh Luhur I	83.29	0
Maos	83.02	0
Majenang I	77.28	0
Karang Pucung II	77.24	0
Lowest Coverage		
Cilacap Selatan I	32.24	0
Jeruklegi	32.38	0
Cilacap Tengah I	34.94	0
Kampung Laut	36.73	0
Wanareja II	42.28	0

Based on **Table 1**, it was found that the Community Health Center with the highest Hepatitis examination coverage is Community Health Center Dayeuhluhur 2 at 88.05%, while the lowest coverage is Community Health Center *Cilacap Selatan* 1 at 32.34%.

Overview of HIV Screening Coverage at Community Health Centers in the Cilacap District

The overview of HIV screening coverage at the Community Health Center in the Cilacap District can be seen in the **Table 2**.

Table 2. Overview of HIV screening coverage at Community Health Centers in the Cilacap District

Community Health Centers	Scope (%)	Reactive results (%)
Highest Coverage		
Dayeuh Luhur II	88.05	0
Dayeuh Luhur I	83.29	0
Maos	83.02	0
Majenang I	77.28	0
Karang Pucung II	77.24	0
Lowest Coverage		
Kedungreja	23.15	0
Jeruklegi 1	32.28	0
Cilacap Selatan I	32.24	0
Cilacap Tengah 1	34.94	0
Kampung Laut	35.27	0

Based on **Table 2**, it was found that the CHC with the highest HIV testing achievement is CHC Dayeuhluhur 2 at 88.05%. The lowest coverage is Community Health Center Kedungreja at 23,15%, with an average HIV testing achievement of 59.81%, and no reactive results were found.

Overview of Siphylis Screening Coverage at Community Health Centers (Puskesmas) in the Cilacap District

The overview of Siphylis screening coverage at the Community Health Center in the Cilacap District can be seen in the **Table 3**.

Table 3. Overview of Siphylis Screening Coverage at Community Health Centers in the Cilacap District

Commnuty Health Centers	Scope (%)	Reactive results (%)
Highest Coverage		
Dayeuh Luhur II	88.05	0
Dayeuh Luhur I	83.29	0
Maos	83.02	0
Karang Pucung II	77.42	0
Majenang 1	77.28	0
Lowest Coverage		
Kedungreja	23.07	0
Jeruklegi I	32.15	0
Cilacap Selatan I	32.22	0
Cilacap Tengah I	34.94	0
Kampung Laut	35.27	0

Based on **Table 3**, it was found that the Community Health Center with the highest syphilis screening achievement is Community Health Center Dayeuhluhur 2 at 88.05%, while the lowest coverage is Community Health Center Kedungreja at 23.07%, with an average syphilis screening achievement of 59.81%.

The average coverage of Hepatitis Testing in Cilacap in 2024 was 61.85. This result is still below the national target in the national action plan for Hepatitis control 2020-2024 which is 95%. The average incidence of reactive hepatitis testing was 0.06%. This is lower than the results of the

examination at Prof. Dr. W. Z. Johannes Hospital Kupang which was 19.7% (20). Based on ministry of health 2022 suggests that the prevalence of HBsAg in pregnant women is also still quite high, ranging from 1.82% to 2.46%. For Hepatitis C, the general prevalence of anti-HCV is 1%. Based on available treatment data, the distribution of Hepatitis C is concentrated in several population groups, including (1) injecting drug users 13.8%-31.1%; (2) hemodialysis patients 3.7%-18.6%; and (3) blood transfusion recipients 4.5-11%.^{6,8}. Liver cirrhosis due to hepatitis is one of 8 high-cost diseases with life-threatening

complications (catastrophic diseases) that are the focus of the National Health Insurance (JKN). Overall, BPJS Health coverage costs during 2014-2016 for Hepatitis B infection amounted to 151 billion rupiah, and 43 billion rupiah for Hepatitis C infection.

The low coverage of hepatitis testing can be influenced by many factors. According to the results it shows that maternal knowledge and attitudes, the role of husbands and the role of health workers have a relationship with maternal participation in hepatitis B screening, and maternal attitudes are the dominant factor influencing participation in hepatitis B screening (OR = 2.24)(21). The low coverage of hepatitis examination in pregnant women can also be influenced by maternal motivation. The results of research found that pregnant women who had low motivation and did not perform triple elimination checks were 72.7% while pregnant women had high motivation and performed triple elimination checks as much as 81.3%. This shows that the higher the motivation of pregnant women increases the mother's actions in conducting triple elimination checks. Motivation means the urge from within humans to do something (22).

The average coverage of HIV testing in Cilacap in 2024 was 59.81%, with the highest coverage of 88.05% and the lowest coverage of 32.34%, with no reactive results found. This result is still below the

national target of 95%. HIV testing is influenced by many factors including age, occupation, knowledge, attitude and work. The results of research by found that age is associated with HIV testing ($p = 0.007$), work is associated with HIV testing ($p = 0.012$). In addition, knowledge is associated with HIV testing ($p = 0.006$) and attitudes are also associated with HIV testing ($z = 0.004$). Researchers also mentioned that occupation has an effect of 5 times on HIV testing / examination (23). Acceptance of HIV testing is also something that needs attention. The results showed that most of the respondents (72.4%) did not accept the HIV test. Factors found to be associated with acceptance of HIV testing by pregnant women were employment, knowledge and husband support. The reason for accepting the test was due to curiosity about their HIV status alone (24).

Behavior of pregnant women towards HIV testing will help achieve the coverage of HIV testing in pregnant women. The research stated that knowledge ($p=0.000$), health worker support ($p=0.033$) and husband support ($p=0.000$) were associated with maternal behavior in conducting HIV testing. The knowledge factor is the dominant factor influencing maternal behavior. Pregnant women who have good knowledge are 10.4 times more likely to do triple elimination checks in the first trimester than lack of knowledge (25). In addition, the factors that influence the behavior of pregnant women in HIV testing are the

mother's attitude and health counseling provided to pregnant women. In accordance showed that pregnant women who had a negative attitude were 54.8% and pregnant women who had never attended counseling were 58.1%, and there was a relationship between attitude and counseling with the behavior of pregnant women in Hepatitis B examination. Attitude in a narrow sense is a view or mental tendency (26). Attitude is a tendency to react to things, people or objects with like, dislike or indifference. Attitude is influenced by the previous experience of pregnant women. Counseling activities are part of health promotion. Health promotion is an effort made to the community so that they are willing and able to maintain and improve their own health. The purpose of this counseling activity for pregnant women is to increase knowledge about the dangers and risks of Hepatitis disease, especially in pregnant women. The benefit of the activity is the formation of a group of pregnant women who can be used as reform agents who can invite other mothers and prospective mothers to positive activities.

The average coverage of syphilis screening in Cilacap district, 59.1%, is still below the national target of 95%. This result is slightly lower than the achievement in Semarang district of 63% (27). The Indonesian government launched a syphilis screening program since the first pregnancy examination. The low coverage of syphilis screening in Cilacap district may be due to

a lack of public awareness of syphilis screening. This may be due to the low education level of the community. Several studies have found that higher education in pregnant women is significantly associated with antenatal screening for HIV and syphilis (28).

This low coverage may also be influenced by visits to the health center made in the 2nd trimester or later. This is in accordance with research in Uganda, that the implementation of screening for syphilis is hampered, because the majority of pregnant women come to check in the 2nd trimester (29). In addition, what affects the participation of pregnant women in syphilis screening is the lack of understanding. This is in accordance with research in Queensland that women's lack of understanding and awareness of health workers about the epidemiology of syphilis leads to a lack of syphilis screening (30). Health education for pregnant women should continue to reinforce the message that untreated maternal syphilis is a danger to the unborn fetus, that syphilis can be diagnosed and treated, and that women should have an antenatal check-up that can screen for syphilis as soon as they learn they are pregnant (31).

Syphilis screening is performed on every pregnant woman in every country, including those with a low incidence of syphilis (32). Every woman is expected to be screened for syphilis at her first antenatal check-up. Women who have their

ANC at a health facility where rapid plasma regain (RPR) testing is available should be tested with the RPR method qualitative and quantitative) (33). Syphilis is transmitted through sexual contact or from mother to child during pregnancy. If untreated, maternal syphilis is expected to result in adverse birth outcomes (ABOs) in 50-80% of affected pregnancies, depending on the stage of syphilis in the woman (34). Vertical transmission can occur at any time during pregnancy, labor, and birth. Transmission can occur if pregnancy occurs at any stage of syphilis, up to 8 years after transmission of the infection. Congenital syphilis can occur when the spirochete is transmitted from a woman with untreated syphilis to the fetus (35). Screening for syphilis in pregnant women has been shown to reduce the incidence of congenital syphilis (36).

To protect the fetus in the womb, it is necessary to screen and treat syphilis in pregnant women. Globally, the target to eliminate congenital syphilis is set, by taking steps to integrate STI screening services with PPIA, screening for syphilis in all pregnant women. The average result of reactive syphilis testing in Cilacap District is 0.59%. This result is lower when compared to the examination in Halmahera Regency which is 13% (37). The difference in coverage between HIV, syphilis and hepatitis screening illustrates that these tests are still not a priority for pregnant women, possibly due to suboptimal follow-up efforts for patients with reactive results.

Coverage of triple elimination screening (Hepatitis, HIV and syphilis) showed a low average. Also revealed that the average percentage of triple elimination coverage in Cilacap District was 60.26%, with coverage in the Western region of 62.31%, the municipal area of 49.75% and the Eastern region of 64.92% (38).

The low coverage of the examination could be due to factors of knowledge, access, husband support and the role of health workers. This is in accordance with the research of Indriani et al (2024), it is known that there is a relationship between knowledge (pvalue = 0.009), access (pvalue = 0.001), the role of health workers (pvalue = 0.000), husband support (pvalue 0.001), with triple elimination checks in pregnant women in the Central Lampung District Health Office Work Area and the role of officers is the dominant factor influencing triple elimination checks (pvalue = 0.001, OR = 3.3417).

More than 90% of HIV, Syphilis and Hepatitis B infection cases in children occur due to maternal transmission. The risk of mother-to-child transmission for HIV/AIDS is 20%-45%, for Syphilis is 69%-80% and for Hepatitis B is more than 90%. Data from the Report of the Ministry of Health of the Republic of Indonesia in 2018, shows that the prevalence of pregnant women who have HIV infection is 0.39%, syphilis infection is 1.7%, and hepatitis B infection is 2.5%. In 2020 in Indonesia, there were 6,094 HIV-positive pregnant women and

4,198 syphilis-positive pregnant women. In order to break the chain of transmission of these three infectious diseases, we must do it together because the pattern of transmission of these diseases is relatively the same, namely from sexual intercourse, blood exchange/contamination and vertically from mother to child, both during the womb, in the process of delivery, and during breastfeeding. The transmission of this infection from mother to child can actually be prevented with simple and effective interventions in the form of early detection or screening during early pregnancy, treatment as early as possible when diagnosed, and immunization. Lack of knowledge and information about HIV, Syphilis, and Hepatitis B infection during pregnancy screening results in high transmission of these infections from mother to child.

Supporting and Hindering Factors in the Implementation of the Triple Elimination Program in the Cilacap District

Supporting Factors in in the Implementation of the Triple Elimination Program in the Cilacap District Qualitative research to explore the supporting factors for the implementation of the triple elimination program was conducted through in-depth interviews with the program managers of the Triple Elimination program at the highest-achieving Puskesmas selecting 5 Puskesmas with the highest achievements. The characteristics of the respondents at this stage can be seen in **Table 4.**

Supporting factors for the achievement of the triple elimination program at the Community Health Center in the Cilacap District, as presented in the **Table 5.**

Table 4. Overview respondent characteristics

Initial	Age/profession	Duration as Program
S	54/Midwife	3
L	37/Nurse	2
M	33/Midwife	2
M	32/Midwife	2
A	53/Midwife	3

Table 5. Supporting factors of triple elimination implementation

Coding	Category	Theme
Mandatory Must Follow The rules Mandatory for Pasien with BPJS Must be done by every pregnant woman Since 2022, it has been mandatory. There is already a regional regulation	Goverment Program Mandatory Program	The implementation of the Triple Elimination program is a government program that must be carried out by all pregnant women.
Implementing the "gertak tritmil" innovation The presence of program innovation to increase coverage Making breakthroughs through strengthening in prenatal classes	The Presence of Novelty Program	There is Inovation of Program to elevate the coverage
Collaboration with networks Collaboration with Privat Midwife's Practice Collaborating with Community Leaders	Conducting cross-sector collaboration	
Joint services with ANC Programs Pregnant women are required to have check-ups at the community health center. Pregnant women are required to undergo an ultrasound examination along with a check-up. Wherever ANC is, it must still be checked at the Puskesmas Mothers who have ANC at the midwife also need to go to the community health center for the Triple E examination. The midwife recommends that pregnant women visit the community health center at least once.	Programs integrated with ANC The Triple Elimination Program is implemented at the Puskesmas.	Triple Elimination Program integrated with ANC

Based on the **Table 5** above, the key factors supporting the five community health centers with the highest triple elimination screening outcomes were: (1) implementation of the government-mandated Triple Elimination Program for all pregnant women; (2) the availability of innovative programs designed to increase screening coverage; and (3) integration of the Triple Elimination Program into routine antenatal care (ANC) services.

Hindering Factors in the Implementation of the Triple Elimination Program in the Cilacap District

Data on factors hindering the implementation of the Triple Elimination Program in Cilacap Regency were collected through in-depth interviews with program coordinators from the five areas with the lowest screening coverage. The characteristics of the interview participants are presented in the **Table 6**.

Table 6. Overview respondent characteristics

Initial	Age/Profession	Duration as Program Coordinator (years)
A	35/Midwife	2
E	52/ Midwife	3
T	55/Midwife	3
S	34/Midwife	3
N	47/Midwife	2

Table 7. Hindering factors of triple elimination implementation

Coding	Category	Themes
Distance problem The distance so far unreachable No. one can accompany The husband working out of town Can't go to Puskesmas	Distance Problem	A factor hindering the implementation of the Triple Elimination Program from the patient's perspective: the distance is far.
Pregnant women have No. know the test Pregnant women do not understand the need for check-ups Pregnant women doesn't know about triple elimination	Less of Knowledge	Inhibiting factors for the implementation of the Triple Elimination Program from the patient's perspective: knowledge and motivation
Pregnant women refuse Triple elimination examination Pregnant women are afraid to see the results of the triple elimination examination Pregnant woman afraid to get triple elimination examination	Less of Motivation	
Family not support The husband do not allow the pregnant woman The husband do not give a permit to this exam Parents in law do not allow The husband cant accompany her No one can accompany her	Lack of family support	Inhibiting factors for the implementation of the Triple Elimination Program from materials: Lack of family support
Incompatible pregnant women's data There are many Pregnant women who have been living away from home for a long time There are many Pregnant women have been examined outside the region The number of real pregnant women with different target pregnant women	Mismatch between real data on pregnant women and target data on pregnant women	Inhibiting factors for the implementation of the Triple Elimination Program from data sources: inconsistency of data on the number of pregnant women

Based on the **Table 7** above, it can be concluded that the inhibiting factors in the coverage of the triple elimination examination in Cilacap Regency are: distance, knowledge and motivation, family support, and the mismatch in the number of pregnant women.

Factors for Triple Elimination Implementation in Cilacap District

Based on the results of in-depth interviews with midwives at Community Health Center with the 5 highest coverage, the following themes were obtained:

It is a government program

The target population for triple elimination testing comprises all pregnant women, who are particularly vulnerable to infections, including sexually transmitted infections. Even when pregnant women receive antenatal care from independent midwifery practices (PMBs), they are still required to undergo triple elimination testing at a community health center.

The World Health Organization (WHO) states that triple elimination targets can be achieved through high-quality maternal and child health programs that comprehensively involve mothers, children, and families. The success of this program depends on the early detection of infections during pregnancy (39). Accordingly, WHO has developed an integrated maternal and child health program that incorporates the prevention, diagnosis, and treatment of HIV,

syphilis, and hepatitis B as part of the triple elimination strategy. The international public health community has also recognized triple elimination as a global health priority.

An integrated approach to triple elimination services offers several benefits, including opportunities for cross-sectoral investment in health systems, capacity building for health workers, improved service outcomes, effective supply management, and sustainable financing. Achieving and maintaining triple elimination requires strong political and public health commitments, including: 1) ensuring access to high-quality primary, preventive, diagnostic, and treatment services for women and children throughout the life course; (2) providing services that uphold human rights and gender equality; and (3) establishing comprehensive surveillance mechanisms to monitor infections and their effects (40).

One factor contributing to the high participation rate among pregnant women was the mandatory nature of triple elimination testing as part of a government program. Consequently, every pregnant woman was expected to undergo the examination. This finding is consistent with the following statement :

..."Because this program is a mandatory government program, which must be carried out by every pregnant woman, pregnant women inevitably have to do this examination" (S, Midwife, 54 years old

Since the Triple Elimination Program was implemented in Bandung in 2018, the coverage of HIV, syphilis, and hepatitis B screening among pregnant women has increased, although the established targets have not yet been achieved. Attaining the program's objectives requires comprehensive coordination among all relevant stakeholders, supported by continuous monitoring and evaluation. (41) The implementation of the Triple Elimination Program in Indonesia has not yet been optimized due to several challenges, including the absence of local policies supporting program implementation, incomplete HIV screening coverage among pregnant women, limited human and material resources, and insufficient support for adherence to antiretroviral therapy (ART) (42) Indonesia's Triple Elimination Program was initiated in 2018 and has been implemented for nearly six years. Eliminating mother-to-child transmission of HIV, syphilis, and hepatitis B generally requires sustained efforts over several years. In the Netherlands, a similar screening program was evaluated in 2011 using data from pregnant women attending their first antenatal visit between 2006 and 2008. The evaluation demonstrated that the program was effective in reducing the vertical transmission of HIV, syphilis, and hepatitis B (43).

The Indonesian government policy in implementing triple elimination checks is carried out at the Community Health Center

So that every pregnant woman is required to make an ANC visit to the Community Health Center as well as for an ultrasound examination. Pregnant women who conduct ANC checks at Independent Midwife Practices, doctors and private clinics, must still be required at least once in pregnancy to come to the Community Health Center.

There are innovations in efforts to increase coverage

Efforts by the government to increase the coverage of triple elimination testing continue. The success of some health centers with high coverage of triple elimination checks is possible due to innovative programs such as the "Gertak Tritmil Program (Gerakan Serentak Pemeriksaan Triple Eliminasi)" carried out by the Community Health Center through efforts to increase awareness of pregnant women to conduct triple elimination checks. This is evidenced by the statement below :

..."At our Community Health Center we did an innovative program ma'am, we have the Gertak Tritmill Program, we involve village midwives in the Community Health Center area to collect data, make home visits to pregnant women and encourage mothers to do triple elimination checks."

This is in line with what was done by Community Health Center Curug launching a new innovation called "Pa Timas Beli Jambu (Tripel Elimination Check at Integrated Health Service)" in an effort to improve the health of pregnant women in

the region(44). In line with what was done by Community Health Center Wonokerto 1 which has an innovation program in the form of "Bu Hajah Sipa" which activities such as recording how many pregnant women have undergone examinations, evaluating whether pregnant women know that they have undergone examinations at the Community Health Center , evaluating pregnant women's knowledge about HIV, Syphilis, and Hepatitis B diseases, providing education about these diseases and the importance of conducting HIV, Syphilis, and Hepatitis B examinations, and encouraging pregnant women to undergo examinations (45).

In addition to the innovation program carried out by the Community Health Center cross-sectoral cooperation was also carried out to increase the participation of pregnant women in the triple elimination examination. This is in accordance with the opinion of the midwife managing the triple elimination program :

...."We involve community leaders from Bu Kaya lurah to RT in the village of the Puskesmas area to be able to urge pregnant residents to do triple elimination checks" (S, 54 years old)

This is in line with the opinion that increasing collaborative efforts among and between programs and sectors will be very beneficial and produce greater impact and result in cost efficiency (46).

In addition, it involves the private sector, such as Independent Midwife

Practices, private practice doctors to be able to advise pregnant women who conduct examinations at their place to be able to carry out triple elimination checks at the local Community Health Center This is in line with the opinion of the Triple Elimination programmer:

...."if we involve the Bu network, rich PMB, specialist doctors to be able to recommend or even require patients who check to be able to do a triple elimination check at the Community Health Center "... (M, 37 th)

This is in accordance with the recommendation of the Ministry of Health that more than 50% of pregnant women who conduct antenatal checks in the private sector, then referral to the Community Health Center for triple elimination checks (47).

The program is implemented with integration with antenatal care

A factor that supports the achievement of the triple elimination test target is the integration of the triple elimination test with antenatal care. This is consistent with the statement below:

..."Yes ma'am, because the triple elimination checkup is done together with the antenatal checkup, so the mother comes at the same time as the ultrasound, and then the triple checkup" (M, 32 years old)

This is beneficial because reducing the number of visits by pregnant women will

increase the acceptance of integrated programs, especially in developing countries where transportation and long-distance travel are major constraints to health service access (48).

In addition, the successful coverage of triple elimination checks can be caused by the government program on the obligation of pregnant women to check at the Community Health Center especially for pregnant women who have BPJS insurance. This is in line with the statement below:

..."Yes, now, inevitably, pregnant women have to come to the health center, ma'am, especially for BPJS participants, they will get free examinations including getting ultrasound services and this examination..." (A, 53 years old)

Pregnant women are recommended to undergo at least six antenatal care examinations during pregnancy: twice in the first trimester, once in the second trimester, and three times in the third trimester. Triple elimination testing is performed during an examination by a physician at the Community Health Center. (49) Rapid diagnostic tests (RDTs), particularly dual HIV–syphilis tests, provide an accurate, accessible, and practical method for the early detection of both infections. However, their testing coverage must be expanded. The government plays an important role in achieving coverage targets by providing financial and policy support for private healthcare providers, including hospitals,

midwives, and physicians, to offer triple elimination testing as a routine component of antenatal care (ANC) (50).

Midwives play an important role in encouraging pregnant women to undergo triple elimination testing. Approximately 85% of pregnant women receive antenatal care from midwives, giving these healthcare professionals substantial opportunities to educate women about the importance of screening for HIV, syphilis, and hepatitis B. The role of midwives also includes facilitating follow-up care for mothers infected with hepatitis B virus (HBV) and their families, as well as providing appropriate referrals to ensure continuity of care. Previous studies have demonstrated that midwives are willing to participate in the care of pregnant women with blood-borne infections, including HBV (51).

Inhibiting Factors of triple elimination in Cilacap Distric

Based on in-depth interviews with midwives at the Community Health Center with the lowest coverage, the following themes were identified:

Distance factor

The long distance is a barrier for pregnant women to undergo the triple elimination test, according to research findings about the inhibiting factors. This is in line with the following responses from the respondents:

..."Some pregnant women who do not

come because their homes are far away, sometimes have no one to accompany them because their husbands are out of town..." (A, Midwife, 35 years old)

Environmental factors are factors that exist outside the organization and are external. Environmental factors that influence the implementation of the triple elimination program for mother-to-child infection transmission include, among others, accessibility. Accessibility is related to transportation and geographical conditions that support the implementation of the triple elimination. Social support includes family support and support from the surrounding community. Social and cultural aspects relate to the socio-cultural environment that a person possesses. Pregnant women who travel long distances to healthcare services may not be interested in undergoing triple elimination tests because the long distance to healthcare services makes it difficult for them to visit. Pregnant women will find it easier to receive triple elimination tests during pregnancy if they live nearby and have adequate facilities (52).

In line with research explaining that the factor enabling someone to receive medical care is distance. There are many factors that can influence distance, such as the lack of support from a husband or family to encourage mothers to undergo their pregnancy check-ups. Whether the mother's residence is near or far, they may not be motivated to do so (53).

Lack of Knowledge and Motivation

Based on the research results, it was found that the lack of knowledge and motivation among pregnant women regarding the importance of Triple elimination is evident in the respondents' opinions as follows:

..."Many pregnant women are confused when they come to the community health center because they don't understand what they need to check and what exactly needs to be checked..."(E, Midwife, 53years old)

..."Sometimes many people are also afraid to be examined at the community health center.." (A, Midwife, 35 years old)

Someone's knowledge can influence the triple elimination test because knowledge will change or alter a person's behavior. By conducting regular health worker examinations, respondents will gain more information so that they can become skilled respondents in the triple elimination test (54).

A good level of knowledge will increase maternal concern and foster a positive attitude towards accessing the triple elimination program, thereby improving the coverage of triple elimination services. Knowledge about something has both positive and negative aspects, influenced by environmental factors, socio-cultural factors, and personal experiences. These aspects determine a person's attitude towards a particular object or issue *eliminasi* (55). In line with the research, explains that

respondents with limited knowledge are due to the lack of information sources obtained about the triple elimination screening. However, its implementation is not yet widespread, as this screening is conducted at community health centers, and many pregnant women still do not visit these centers for the triple elimination screening. (56).

Lack of family support

The family support referred to in this study is: the respondents' perceptions of emotional support, appreciation support, material support, and informational support they receive, especially from their husband/partner, related to the implementation of triple elimination. This is in accordance with the respondents' answers as follows:

...“there are still pregnant women who actually want to be examined but coincidentally their husbands do not allow it because according to the husband, health during pregnancy is entrusted to Allah SWT alone, so they don't stress about what disease...” (T, midwife, 55 years old)

...“Actually, usually the mother-in-law also forbids it, thinking it only adds to the thoughts and stress during pregnancy, so they don't check...” (S, Midwife, 34 years old)

The above statement is in line with research that confirms the relationship between individual attitudes and family support. Showing a significant correlation

between mothers' perceptions of the family support they receive from their husbands and their attitudes towards triple elimination screening. In other words, mothers who feel supported by their husbands, or have negative perceptions, also tend to have negative attitudes towards triple elimination screening. A wife can be motivated by her husband to meet her family's health needs, such as seeking medical treatment, receiving prenatal care (antenatal care), including triple elimination and toddler immunization, and other health needs. The husband's education should also focus on his knowledge about triple elimination.

Discrepancy in the data on the number of pregnant women

Based on the research results regarding the inhibiting factors, it was found that there is a discrepancy in the data on the number of pregnant women who undergo triple elimination tests. This is consistent with the respondents' answers as follows:

...“The actual number of pregnant women is different from the target number of pregnant women, so it indeed does not meet the target, many ...” (N, Midwife, 47 years old)

...“then many pregnant women moved away, causing the number to decrease and not meet the target..” (A, midwife, 35 years old)

Proven by the results showing that Cilacap Regency has an average triple

elimination examination coverage percentage of 60.46%, with the western region at 62.31%, the urban region at 49.75%, and the eastern region at 64.92%. Thus, these three regions indicate the failure to achieve the 100% triple elimination coverage target set by the Ministry of Health. The number is influenced by the fact that many pregnant women have moved away or even sought check-ups elsewhere, causing the actual number of pregnant women to differ from the target for triple elimination screening.

CONCLUSION AND RECOMMENDATION

The study found that hepatitis B screening coverage ranged from 32.34% to 88.05%, with a mean coverage of 61.85% and an average reactive rate of 0.59%. HIV screening coverage ranged from 32.34% to 88.05%, with a mean of 59.81% and no reactive cases identified. Syphilis screening coverage ranged from 32.22% to 88.05%, with a mean of 59.81% and an average reactive rate of 0.06%.

The factors supporting the implementation of the Triple Elimination Program included its status as a government-mandated program, the availability of innovative initiatives designed to increase screening coverage, and the integration of triple elimination testing into antenatal care (ANC) services. In contrast, the factors inhibiting screening coverage in Cilacap Regency included long distances to healthcare facilities, limited knowledge and

motivation among pregnant women, insufficient family support, and discrepancies in data regarding the number of pregnant women.

Based on these findings, healthcare providers should strengthen health education for pregnant women and their families regarding the importance of triple elimination testing. Service innovations should also be developed to make testing more accessible, particularly for women living far from healthcare facilities. In addition, the system used to estimate and record the target population of pregnant women should be improved to ensure consistency and accuracy across data sources.

REFERENCES

1. WHO. 2021 progress report on the Global Action Plan for Healthy Lives and Well-being for All. 2021. <https://www.who.int/publications/i/item/9789240026209>
2. WHO. Regional framework for the triple elimination of mother-to-child transmission of HIV, hepatitis B and syphilis in Asia and the Pacific, 2018-2030. 2018. <https://www.who.int/publications/i/item/9789290618553>
3. Kemenkes RI. (2023). Laporan Eksekutif Perkembangan Hiv Aids Dan Penyakit Infeksi Menular Seksual (Pims) Tahun 2023. Kemenkes RI, 7, 1–15. https://siha.kemkes.go.id/portal/files_upload/Laporan_TW_3_2022.pdf

4. Cohn J, Owiredun MN, Taylor MM, Easterbrook P, Lesi O, Francoise B, et al. Eliminating mother-to-child transmission of human immunodeficiency virus, syphilis and hepatitis B in sub-Saharan Africa. *Bull World Health Organ.* 2021; 99(4): 287–95. <https://doi.org/10.2471/BLT.20.272559>.
5. Armini LN, Setiawati EP, Arisanti N, Hilmanto D. Evaluation of Process Indicators and Challenges of the Elimination of Mother-to-Child Transmission of HIV, Syphilis, and Hepatitis B in Bali Province, Indonesia (2019–2022): A Mixed Methods Study. *Trop Med Infect Dis.* 2023 Nov 1;8(11). <https://doi.org/10.3390/tropicalmed8110492>
6. Elgalib A, Lau R, Al-Habsi Z, Shah S, Al-Rawahi B, Memish ZA, et al. Elimination of mother-to-child transmission of HIV, syphilis and viral hepatitis B: A call for renewed global focus. *International Journal of Infectious Diseases.* Elsevier B.V.; 2023. p. 33–5 <https://doi.org/10.1016/j.ijid.2022.11.031>.
7. Bell L, van Gemert C, Allard N, Brink A, Chan PL, Cowie B, et al. Progress towards triple elimination of mother-to-child transmission of HIV, hepatitis B and syphilis in Pacific Island Countries and Territories: a systematic review. *Lancet Reg Health West Pac.* 2023 Jun 1;35. <https://doi.org/10.1016/j.lanwpc.2023.100740>
8. Abraha A, Myléus A, Byass P, Kahsay A, Kinsman J. The effects of maternal and child HIV infection on health equity in Tigray Region, Ethiopia, and the implications for the health system: a case-control study. *AIDS Care - Psychological and Socio-Medical Aspects of AIDS/HIV.* 2019 Oct 3;31(10):1271–81 <https://doi.org/10.1080/09540121.2019.1601670>.
9. Afraie M, Moradi G, Zamani K, Azami M, Moradi Y. The effect of hepatitis B virus on the risk of pregnancy outcomes: a systematic review and meta-analysis of cohort studies. *Virol J.* 2023 Dec 1;20(1) <https://doi.org/10.1186/s12985-023-02182-0>.
10. Joshi SS, Coffin CS. Hepatitis B and Pregnancy: Virologic and Immunologic Characteristics. *Hepatology Communications.* John Wiley and Sons Inc; 2020. p. 157–71. <https://doi.org/10.1002/hep4.1460>
11. Lawn JE, Blencowe H, Waiswa P, Amouzou A, Mathers C, Hogan D, et al. Stillbirths: Rates, risk factors, and acceleration towards 2030. *The Lancet.* Lancet Publishing Group; 2016. p. 587–603. [https://doi.org/10.1016/S0140-6736\(15\)00837-5](https://doi.org/10.1016/S0140-6736(15)00837-5).
12. Qin J, Yang T, Xiao S, Tan H, Feng T, Fu H. Reported estimates of adverse pregnancy outcomes among women with and without syphilis: A systematic review and meta-analysis. *PLoS ONE.*

- Public Library of Science; 2014
<https://doi.org/10.1371/journal.pone.0102203>.
13. Winata IGS, Setiawan WA, Widhusadi NLWA, Maharddhika DJ, Christyani F, Darmayasa PB, et al. Diagnosis and management of syphilis infection in pregnancy: a literature review. *Indonesian Journal of Perinatology*. 2023 Feb 10;4(1):10–4. <https://doi.org/10.51559/inajperinatol.v4i1.28>
 14. ACOG (American College of Obstetricians and Gynecologists). Screening for Syphilis in Pregnancy. 2024. <https://www.acog.org/clinical/clinical-guidance/practice-advisory/articles/2024/04/screening-for-syphilis-in-pregnancy>
 15. Lin JS, Michelle Eder M, Bean S. Screening for Syphilis Infection in Pregnant Women: A Reaffirmation Evidence Update for the U.S. Preventive Services Task Force. *Pub Med*. 2018. <https://pubmed.ncbi.nlm.nih.gov/30234936/>
 16. WHO. Progress Report and Road Map for the Triple Elimination of Mother-to-Child Transmission of HIV, Syphilis and Hepatitis B in the Middle East and North Africa/ Eastern Mediterranean Region. 2024.
 17. WHO. Introducing a framework for implementing triple elimination of mother-to-child transmission of HIV, syphilis and hepatitis B virus: policy brief. 2024. <https://www.who.int/publications/i/item/9789240086784>
 18. Kemenkes RI. Peraturan Menteri Kesehatan Republik Indonesia NO 52 Tahun 2017. Kementerian Kesehatan. 2017. <https://jdih.kemkes.go.id/documents/peraturan-menteri-kesehatan-nomor-52-tahun-2017>
 19. Wardiana M, Prakoeswa CRS, Sawitri, Rahmadewi, Astari L, Prasetyo B, et al. Dealing with tests and treatments for HIV, syphilis, and hepatitis B infection to prevent mother-to-child transmission (MTCT) from a tertiary hospital in Indonesia. *Bali Medical Journal*. 2022;11(1):334–40. <https://doi.org/10.15562/bmj.v11i1.3376>
 20. Tangkelangi M, Wuan AO, Rogaleli YCL. Prevalence and Risk Factor of Hepatitis B among Pregnant Women in Prof. Dr. W. Z. Johannes Hospital Kupang, East Nusa Tenggara, Indonesia. *Jurnal Bidan Cerdas*. 2023 Dec 31;5(4):220–6. <https://doi.org/10.33860/jbc.v5i4.3262>
 21. Apriadi D. Analisis faktor keikutsertaan screening hepatitis “B” pada ibu hamil. *Jurnal SAGO Gizi dan Kesehatan*. 2022 Jan 10;3(1):51. <https://doi.org/10.30867/gikes.v3i1.717>
 22. Anes CC, Dolfinus Yufu Bouway, Asriati, Katarina Lodia Tutuop, Agustina R. Yufua, Konstantina Pariaribo. Faktor-Faktor yang Memengaruhi Ibu Hamil terhadap Pemeriksaan Triple Eliminasi di

- Puskesmas Maripi Kabupaten Manokwari Provinsi Papua Barat. *Jurnal Kesehatan*. 2023 Dec 5;291–300.<https://doi.org/10.23917/jk.v16i3.2688>
23. Banjarnahor, U. A., El-Matory, H. J., & Sitorus, F. E. Determinan yang Mempengaruhi Ibu Hamil untuk Pemeriksaan HIV di Wilayah Kerja Puskesmas Rawang Pasar IV Kabupaten Asahan. *Jurnal Kajian Kesehatan Masyarakat*. 2024; 5(1). <https://doi.org/10.36656/jk2m.v5i1.1486>
 24. Triani H. Faktor-Faktor:, Mempengaruhi Y, Bandung SI. Faktor-Faktor Yang Mempengaruhi Perilaku Ibu Hamil Dalam Melakukan Pemeriksaan Test HIV Di Puskesmas Ibrahim Adji Bandung 2019. *Jurnal Kesehaan STIKes Muhammadiyah Ciamis*. 2020; 6(1). 25-33. <https://doi.org/10.52221/jurkes.v6i1.57>
 25. Agustini G.A.N.S.R, Suarjana N, Astuti N.P.W. Faktor-Faktor yang Mempengaruhi Perilaku Ibu Hamil dalam Melakukan Pemeriksaan Triple Eliminasi Pada Trimester I di UPTD Puskesmas Kediri I Tabanan. 2023; 2(2).<https://doi.org/10.36002/js.v2i2.2618>
 26. Dewi HS, Lilia D, Meliyanti F. Faktor-Faktor yang Berhubungan dengan Perilaku Ibu Hamil dalam Pemeriksaan Hepatitis B. *Jurnal Ilmiah Multi Science Kesehatan [Internet]*. 2023 Dec;15(2):126.<https://doi.org/10.36729/bi.v15i2.1130>
 27. Ayunda N Dela, Arso SP, Nandini N. Pelaksanaan Program Triple Elimination pada Ibu Hamil di Puskesmas Karanganyar Kota Semarang Menggunakan Model CIPP. *Media Kesehatan Masyarakat Indonesia*. 2023 Jun 1;22(3): 209–16.<https://doi.org/10.14710/mkmi.22.3.209-216>
 28. Davis R, Xiong X, Althabe F, Lefante J, Cafferata ML, Mwenechanya M, et al. Factors associated with HIV and syphilis screenings among pregnant women at first antenatal visit in Lusaka, Zambia. *BMC Res Notes*. 2020 Sep 7;13(1 <https://doi.org/10.1186/s13104-020-05266-0>).
 29. Oloya S, Lyczkowski D, Orikiriza P, Irama M, Boum Y, Migisha R, et al. Prevalence, Associated Factors and Clinical Features of Congenital Syphilis Among Newborns in Mbarara hospital, Uganda. *BMC Pregnancy Childbirth*. 2020 Jul 2;20(1 <https://doi.org/10.1186/s12884-020-03047-y>).
 30. Warzywoda S, Fowler JA, Nourse C, Wu M, Britton S, Rowling D, et al. Syphilis in pregnancy: A qualitative investigation of healthcare provider perspectives on barriers to syphilis screening during pregnancy in south-east Queensland. *Sex Health*. 2023 May 29;20(4):330–8 <https://doi.org/>

- 10.1071/SH22193.
31. Gao J, Chen X, Yang M, Wu Y, Liang T, Li H, et al. Adverse pregnancy outcomes and associated risk factors among pregnant women with syphilis during 2013–2018 in Hunan, China. *Front Med (Lausanne)*. 2023;10. <https://doi.org/10.3389/fmed.2023.1207248>
 32. WHO. Syphilis screening and treatment for pregnant women. 2017. <https://www.who.int/publications/i/item/9789241550093>
 33. World Health Organization. Updated recommendations for the treatment of *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Treponema pallidum* (syphilis), and new recommendations on syphilis testing and partner services. Geneva, Switzerland: Author.2024.<https://iris.who.int/server/api/core/bitstreams/3cb57ec4-fc62-435c-a295-5cbaa5bd0676/content>
 34. Desjardins, A. A., Amaral, E., Miranda, J., Pasupathy, D., Martins, M. L., Buga, E., Aronoff, D., Money, D., & Boucoiran, I. Syphilis in pregnancy: A practical guide for prenatal care providers. *International Journal of Gynecology & Obstetrics*. 2025; 171(2): 601-610. <https://doi.org/10.1002/ijgo.70511>
 35. Government of South Australia. Management of Syphilis during Pregnancy. 2022.
 36. Asher GN, Viswanathan M, Takyi A, Middleton JC, Baker C, Kahwati LC. Screening for syphilis infection during pregnancy: Updated evidence report and systematic review for the US Preventive Services Task Force. *JAMA*. 2025; 333(22):2015–2017. <https://doi.org/10.1001/jama.2025.1179>
 37. Kitong A, Makalew LA, Sumampouw JE. Gambaran Hasil Pemeriksaan Sifilis pada Ibu Hamil Dengan Metode Immunochromatography Di Puskesmas Pitu Kabupaten Halmahera Utara. *Indonesian Journal of Medical Laboratory Technology*. 2022; 1(1).27-30. <http://repository.poltekkes-manado.ac.id/1071/>
 38. Saptiyani P.M, Apriani E, Johariyah. Gambaran Cakupan Pemeriksaan Triple Eliminasi di Kabupaten Cilacap. *Jurnal Kesehatan Al-Irsyad*. 2024 ;17(1).<https://doi.org/10.36760/jka.v17i1.229>
 39. WHO. Global Guidance On Criteria and Processes for Validation: Elimination of Mother To Child Transmission of HIV, Syphilis and Hepatitis B Virus. 2021.
 40. WHO. Introducing a Framework for Implementing Triple Elimination of Mother-to-Child Transmission of HIV, Syphilis and Hepatitis B Virus. 2023.
 41. Azhali BA, Setiabudi D, Alam A. Evaluating the impact of triple elimination program for mother-to-child transmission of HIV, syphilis, and hepatitis B in Indonesia. *Narra J*. 2023

- Dec 1;3(3). <https://doi.org/10.52225/narra.v3i3.405>
42. Sulyastini NK, Wirawan IMA. Antenatal Education to Support Triple Elimination Program: A Systematic Literature Review. *Jurnal Penelitian Pendidikan IPA*. 2023 Aug 25;9(8):474–85. <https://doi.org/10.29303/jppipa.v9i8.4234>
 43. Visser M, Van Der Ploeg CPB, Smit C, Hukkelhoven CWPM, Abbink F, Van Benthem BHB, et al. Evaluating progress towards triple elimination of mother-to-child transmission of HIV, syphilis and hepatitis B in the Netherlands. *BMC Public Health*. 2019 Mar 29;19(1) <https://doi.org/10.1186/s12889-019-6668-6>.
 44. Buku Profil Daerah Kabupaten Bogor. Puskesmas Curug Perkenalkan Inovasi PA TIMAS BELI JAMBU untuk Tingkatkan Kesehatan Ibu Hamil. 2024. Bogor <https://setda.bogorkab.go.id/berita/seputar-opd/puskesmas-curug-perkenalkan-inovasi-pa-timas-beli-jambu-untuk-tingkatkan-kesehatan-ibu-hamil>
 45. Puskesmas Wonokerto 1. Implementasi Program Triple Eliminasi, Puskesmas Luncurkan Program Inovasi Bu Hajah Sipa. 2026. Pemerintah Kabupaten Pekalongan. <https://puskesmaswonokerto1.pekalongankab.go.id/articles/implementasi-proram-triple-eliminasi-puskesmas-luncurkan-program-inovasi-bu-hajah-sipa>
 46. Pantelias, A., Brooks, A., & Jacobson, J. Lessons from working across public health programs and a proposal for how to facilitate further cross-program collaboration to achieve NTD goals. *Bridges to Development*. 2024. <https://glideae.org/wp-content/uploads/2024/10/Cross-Sector-Collaboration-Review-Whitepaper.pdf>
 47. Wulandari LPL, Lubis DSM, Widarini P, Widyantini DN, Wirawan IMA, Wirawan DN. HIV Testing Uptake Among Pregnant Women Attending Private Midwife Clinics: Challenges of Scaling up Universal HIV Testing at The Private Sectors in Indonesia. *International Journal of Health Planning and Management*. 2019 Oct 1;34(4):1399–407. <https://doi.org/10.1002/hpm.2807>.
 48. Bhandari, S., Shrestha, A., Poudel, R., et al. Cost-effectiveness of integrated maternal HIV, syphilis, and hepatitis B screening opt-out strategies in Nepal: A modelling study. *The Lancet Regional Health – Southeast Asia*, 32, 100524. 2024; 4(10). <https://doi.org/10.1016/j.lansea.2024.100524>
 49. Kemenkes RI. Pedoman Pelayanan Antenatal Terpadu. 2020.
 50. Wardiana M, Prakoeswa CRS, Sawitri, Rahmadewi, Astari L, Prasetyo B, et al. Dealing With Tests and Treatments for HIV, Syphilis, and Hepatitis B Infection to Prevent Mother-to-Child

- Transmission (MTCT) From a Tertiary Hospital in Indonesia. *Bali Medical Journal*. 2022; 11(1):334–40. <https://doi.org/10.15562/bmj.v11i1.3376>
51. Saroyo, Y. B., Baihaki, Dilmy, M. A. F., Novianti, L., & Elsiyana, T. A. The level of knowledge, attitude, practice, and adherence of obstetricians and gynecologists towards the Triple Elimination Program (HIV, syphilis, hepatitis B) in maternal services at government and private hospitals in Jakarta. *International Journal of Environmental Research and Public Health*. 2026; 23(8), 1090. <https://doi.org/10.3390/ijerph23081090>
 52. Wulandari A, Retno Palupi Yonni Siwi, Erma Retnaningtyas, Maria Meilina Billy. Factors Affecting Mother Of Doing A Triple Elimination At Uptd Of Palla Public Health Center, North Wewewa Sub-District, Southwest Sumba Regency. *Science Midwifery*. 2022;10(5):4100–8.<https://doi.org/10.35335/midwifery.v10i5.993>
 53. Bida FY, Bouway DY, Irab SP, Paskawati N, Kesehatan F, Universitas M. Faktor yang Berhubungan dengan Pemeriksaan Triple Elimination pada Ibu Hamil di Puskesmas Abepantai Pendahuluan Ibu hamil yang terinfeksi HIV dan tidak menjalani pengobatan mengakibatkan separuh anak yang dilahirkan terinfeksi HIV dan separuh. *Jurnal Kesehatan Masyarakat Khatulistiwa (JKMK)*. 2024;11(02):90–8.<https://doi.org/10.29406/jkmk.v11i2.6703>
 54. Istawati R, Angrainy R, Putri M. Hubungan Pengetahuan Dan Sikap Ibu Hamil Dengan Pemeriksaan Triple Eliminasi di Puskesmas Payung Sekaki Kota Pekanbaru Tahun 2023. *INNOVATIVE: Journal Of Social Science Research*. 2023;3(6): 10578–88.
 55. Koamesah SMJ, Trisno I, Rante SDT. Relationship between Knowledge, Family Support, Frequency of Information, and Attitude Towards Triple Elimination Testing During COVID-19. *Lontar : Journal of Community Health*. 2021;3(1):1–9. <https://doi.org/10.35508/ljch.v3i1.3821>
 56. Wulandari LA. Faktor-Faktor Yang Berhubungan Dengan Pemeriksaan Triple Eliminasi (Hiv/Aids/Sifilis Dan Hepatitis B) Di Wilayah Kerja Puskesmas Way Mili Kabupaten Lampung Timur. *Midwifery Journal*. 2023;21(1):1–11.