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Challenges in Implementing the Triple Elimination of Mother-to-Child Transmission: A Study from Coastal Region of Ambon, Indonesia

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ABSTRACT

Background: HIV, syphilis, and hepatitis B can be transmitted during pregnancy, which can cause morbidity and mortality. Efforts to eliminate the transmission of HIV, syphilis, and hepatitis B are contained in the Minister of Health Regulation through Antenatal Care services in community health centers by screening and case management of positive pregnant women. The coverage of triple elimination in Eastern Indonesia has not been implemented, especially in Ambon City, while the goal in 2022 is that 100% of pregnant women will be screened and managed to prevent perinatal transmission. **Purpose:** This study aimed to evaluate the implementation of triple elimination screening including coverage, completeness, and infection rates in Ambon City. **Methods:** This study is a descriptive retrospective analysis based on medical records from four Community Health Centers during the year 2022. **Result:** Among 1,666 pregnant women, only one of the four centers (25%) met the national screening coverage target. None achieved 100% test completeness. Syphilis showed the highest infection rate (up to 12.2%), while hepatitis B rates were below the national threshold (≤7.1%) in all centers. **Conclusion**: Ambon City's triple elimination screening implementation has not met national criteria. Enhancing program efficacy requires expanding access to screening services and bolstering health education.

Keywords*:* Triple Elimination, Ambon City, Pregnant Woman, HIV, Syphilis, Hepatitis B.

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BACKGROUND

The Indonesian Ministry of Health stated in 2020 that infections in pregnancy amounted to 6.06%, which ranks fifth in direct causes of maternal death.[1] Pregnant women are vulnerable to infections, including sexually transmitted infections, due to risky sexual behavior and a weakened immune system during pregnancy.[2] Human Immunodeficiency Virus (HIV), syphilis, and hepatitis B are three infectious diseases that can be transmitted vertically during pregnancy, leading to morbidity and mortality.[3] HIV caused 40.1 million deaths during 2021.[4] In 2020 Maluku ranked 22nd with a total of 350 reported cases of HIV.[5] The World Health Organization stated that in 2019, syphilis was detected in 1% or more of pregnant women undergoing Antenatal Care (ANC) in 38 out of 78 countries.[6] The WHO estimated that 296 million people were living with chronic hepatitis B 2019, with 1.5 million new infections each year.[7] In Maluku Province, the prevalence of hepatitis B was 9.09%, ranking fifth lowest, while the rate of reactive HBsAg among pregnant women was 3.65% (higher than the national average of Indonesia, which is 2.21%).[8]

Infectious diseases such as HIV, syphilis, and hepatitis B can be prevented through early screening and management of positive cases in pregnant women, in line with the Sustainable Development Goals 3 (SDGs) goals for healthy living and disease control.

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This approach is regulated in the Minister of Health Regulation No. 52 of 2017, referred to as "Triple Elimination," aimed at stopping the transmission from mother to child. The initial target for achieving triple elimination was to have ≤ 50 cases of infected children per 100,000 live births by 2022, followed by a target of zero by 2030.[9,10] Research conducted by Maya Wardiana et al.11 in 2022 indicated that the number of HIV, syphilis, and hepatitis B tests among pregnant women in tertiary hospitals in Eastern Indonesia in 2018 (14.1%) was still below the WHO target of ≥ 95%.

Given that the triple elimination screening has not been performed in Ambon City and prior studies suggest that the targets have failed to achieve the national coverage objective of 100%, validation and management enhancements are necessary. This study seeks to assess the execution of the screening program in Ambon City. This study specifically evaluates coverage, data completeness, and infection rates in four community health clinics in districts with the greatest frequency of ANC visits. The results are anticipated to yield significant insights that improve the program's efficacy..

METHODS

A descriptive retrospective study was conducted to evaluate the implementation of the triple elimination screening program for pregnant women in Ambon City during 2022. Total sampling was employed, and data were collected from four community health centers: Poka-Rumah Tiga, Passo, Benteng, and Rijali. These sites were selected based on 2022 ANC visit data, which indicated the highest number of visits within the city. Collected data were analyzed using descriptive statistical methods.

Univariate analysis was used to determine the proportion of each variable measured, including maternal age, education level, occupation, gravida status, coverage of triple elimination screening, screening completeness, screening results, and the type of therapy administered following the screening. The findings were presented in frequency distribution tables accompanied by descriptive explanations. Data were categorized into relevant variable groups and presented in numerical form and percentages for each criterion. Bar diagrams were also used to illustrate the data distribution more specifically. To ensure data accuracy and prevent duplication, the processes of editing, coding, data entry, and cleaning were conducted prior to analysis.

Data were obtained from three primary sources: ANC registers, laboratory registers, and the medical records of pregnant women, totaling 1,666 cases. Data collection was carried out between March and June 2023. The inclusion criteria encompassed all pregnant women who received ANC services at the four selected community health centers during 2022. No exclusion criteria were applied, as the entire relevant population was included using a total sampling method. This study was conducted following ethical approval from the Ethics Commission of the Faculty of Medicine, Universitas Pattimura Ambon, as documented with No: 030/FK-KOM.ETIK/VII/2023.

RESULT

Table 1 presents the coverage of triple elimination screening across four community health centers, involving a total of 1,666 pregnant women. The Rijali Community Health Center achieved 100% screening coverage. In contrast, the remaining three centers did not meet the national coverage target: Benteng (97.6%), Poka-Rumah Tiga (97.4%), and Passo (95.8%).

Table 1. Coverage of triple elimination testing in 2022

Health Centers	N	Test Coverage			
		Performed (n)	%	Not Performed (n)	%
Poka-Rumah Tiga	421	410	97.4	11	2.6
Passo	357	342	95.8	15	4.2
Benteng	340	332	97.6	8	2.4
Rijali	548	548	100	0	0
Total	1666	632	98.0	34	2.0

Figure 1 illustrates the completeness of the triple elimination tests (HIV, syphilis, and hepatitis B), revealing that none of the four community health centers conducted fully complete testing. Instead, testing was limited to only one or two of the required tests. The data show that none of the centers achieved the national target of 100% completeness, defined as the administration of all three tests, in 2022. Further details indicate that HIV test coverage exceeded 90% at all four centers, syphilis test coverage ranged from

50% to 70%, and hepatitis B test coverage was above 80% across all centers.

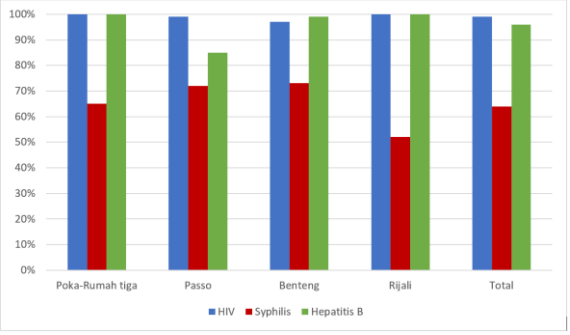

Figure 1. Completeness of Triple Elimination Testingat Four Community Health Centers in 2022.

Table 2 shows the Community Health Centers in Passo have a maximum infection rate of 0.9%, exceeding the Ministry of Health's threshold of 0.3%. Meanwhile, the other three community health centers (Poka-Rumah Tiga, Benteng, and Rijali) met the established criteria.

Table 2. Maximum HIV infection rates in four community health centers in 2022

Health Centers	HIV Test		Maximal Infection (%)	Meet the Criteria or Not
	Number of Test (n)	Number of Positive (n)		
Poka-Rumah Tiga	410	1	0.2	Yes
Passo	339	3	0.9	No
Benteng	324	0	0	Yes
Rijali	548	1	0.2	Yes

HIV = Human Immunodeficiency Virus

Table 3 shows that the Poka–Rumah Tiga, Passo, and Benteng Community Health Centers did not meet the national standard for syphilis infection rates, exceeding the maximum allowable threshold of 1.70%. In contrast, the Rijali Community Health Center remained below this threshold. The syphilis infection rates at the four centers, listed from highest to lowest, were as follows: Passo (12.2%), Benteng (5.0%), Poka-Rumah Tiga (2.2%), and Rijali (1.0%).

Table 3. Maximum syphilis infection rates in four community health centers in 2022

Health Centers	Syphilis Test		Maximal Infection (%)	Meet the Criteria or Not
	Number of Test (n)	Number of Positive (n)		
Poka-Rumah Tiga	268	6	2.2	No
Passo	246	30	12.2	No
Benteng	239	12	5.0	No
Rijali	286	3	1.0	Yes

Indicates that all four community health centers comply with the maximum hepatitis B infection criteria established by the Ministry of Health, which is below the threshold of 7.10%. The maximal infection percentages for hepatitis B at the four community health centers, listed from highest to lowest, are as follows: Poka-Rumah Tiga Center (5.4%), Benteng Health Center (4.2%), Passo Health Center (3.5%), and Rijali Health Center (2.9%).

Table 4. Maximum hepatitis B infection rates in four community health centers in 2022

Health Centers	Hepatitis B Test		Maximal Infection (%)	Meet the Criteria or Not
	Number of Test (n)	Number of Positive (n)		
Poka-Rumah Tiga	410	22	5.4	Yes
Passo	228	10	3.5	Yes
Benteng	331	14	4.2	Yes
Rijali	548	16	2.9	Yes

DISCUSSION

The triple elimination test coverage at the four community health centers did not meet the 100% target set by the Ministry of Health Regulation No. 52 of 2017. Inadequate screening coverage significantly increases the risk of vertical transmission during pregnancy, particularly when pregnant women are not tested. The primary goal of screening is to promptly and accurately detect symptoms and signs of infection, enabling early treatment to prevent transmission to the

infant.[8] Preventing mother-to-child transmission is essential to avoid serious long-term outcomes that may impair a child's quality of life, including low birth weight, prematurity, stillbirth or neonatal death, neurosyphilis, and long-term disabilities such as growth delays, cognitive impairment, and reduced intelligence.[11]

Based on the results of the research conducted at four community health centers, the following findings were obtained: In Poka-Rumah Tiga community health center, 268 out of 410 pregnant women (65.4%) who underwent a complete examination were tested. In Passo community health center, out of 342 pregnant women, only 193 women (56.4%) underwent a complete examination. In Benteng community health center, out of 332 pregnant women, 193 women (56.4%) underwent a complete examination. In Rijali community health center, out of 332 pregnant women, 230 women (69.3%) underwent a complete examination.

Minister of Health Regulation No. 52 of 2017 has established a screening indicator for triple elimination that is sequentially set at 100%, meaning pregnant women are expected to receive complete screening (100%) for all three diseases. The number of HIV infections at these four centers varies significantly; some have reached the maximum threshold set by Minister of Health Regulation No. 52 of 2017, which is 0.30%, while three community health centers have successfully met the target and remain below this threshold. The low HIV case numbers in some community health centers do not reflect a large native population due to the stigma associated with the disease, leading to a reluctance to undergo screening. According to research by Last JM,[12] in 2013 the number of HIV cases in Indonesia did not correspond to the severity of the problem, indicating a need for primary care services to serve as a platform for promotion and education.

The availability of local reagents for triple elimination screening in each region is coordinated by the respective city health offices. The unavailability of reagents is influenced by several factors, including the quality of the reagents, insufficient quantities, and the management of screening utilization. These issues require further attention and consideration. The low infection rates may be due to a lack of available reagents or their depletion, which affects the implementation of triple elimination.[13] Missing or incomplete medical records can also contribute to the low infection rates. This aligns with Minister of Health Regulation No. 24 of 2022, which emphasizes the necessity for complete and clear medical record documentation for all examination results and healthcare services.[14]

The maximum syphilis infection rates at the four community health centers are as follows: Poka-Rumah Tiga (2.2%), Passo (12.2%), Benteng (5.0%), and Rijali (1.04%). The availability of syphilis reagents at the Passo Community Health Center appears to be higher compared to the other health centers, allowing for a larger number of individuals to be screened. Three of the community health centers have exceeded the maximum infection rate set at 1.70%, while Rijali remains below the target. Pregnant women only underwent two tests because all four community health centers ran out of syphilis testing reagents. This finding is consistent with Sulyastini NK et al. (2023),[13] which states that the availability of testing logistics affects the effectiveness of triple elimination tests. The implications for babies include congenital syphilis, stillbirth, hydrops fetalis, neonatal death, low birth weight, prematurity, and congenital defects.[15] A similar study by Visser et al.[10] reported low rates of syphilis and congenital infections while examining progress toward triple eliminations; however, the WHO recommends revalidation of these findings. The absence of local regulations supporting the achievement of triple elimination targets across all regions of coastal Ambon represents a significant policy gap. This study highlights that the current situation does not yet align with national targets. Therefore, it is necessary to reassess existing health intervention strategies and to encourage local governments to strengthen surveillance systems, expand antenatal screening coverage, and ensure the availability and equitable access to treatment services. These efforts should be integrated into a more adaptive and context-specific local policy framework.

The maximum hepatitis B infection rates at the four community health centers are as follows: Poka-Rumah Tiga at 5.3%, Passo at 3.4%, Benteng at 4.2%, and Rijali at 2.9%. These results indicate that all four community health centers have low hepatitis B infection rates, below the maximum infection rate set by the Ministry of Health, which is 7.10%.

Pregnant women who test positive need to understand methods for preventing vertical transmission, such as the rapid and accurate identification of HBsAg, which will allow for the administration of treatment (either passive or active prophylaxis) to newborns. The hepatitis B screening program has not been fully implemented effectively; a study conducted in Italy indicated that 2.3% of the total

17,260 pregnant women did not undergo hepatitis B screening, leading to significant transmission risks that could affect the newborns. To maintain comprehensive screening, it is essential to strengthen outreach programs, provide adequate education for pregnant women, and ensure the consistent availability of screening reagents and resources.[16]

Although cases of hepatitis B in pregnant women are rare, the infection has the potential to cause hepatic cirrhosis and hepatocellular carcinoma, increasing the risk of maternal and fetal mortality. Additionally, hepatitis B can lead to other complications during pregnancy, such as gestational diabetes, antepartum hemorrhage, preeclampsia, premature birth, and miscarriage.[17,18]

Low screening coverage, incomplete testing, and high rates of viral infections remain significant challenges for the triple elimination program. These issues point to the need for urgent policy interventions and the strengthening of the triple elimination screening system through improved coordination between the government, city health offices, and Community Health Centers. This includes better management of logistics distribution, healthcare worker training, digitization of medical record systems, improved resource allocation, and more effective public health strategies. These efforts are essential to reduce the transmission of infections and ensure better health outcomes for mothers and newborns. These challenges point to the need for urgent policy interventions and the strengthening of the triple elimination screening system through enhanced coordination among the government, city health offices, and community health centers. Key areas for improvement include more efficient logistics management, comprehensive training for healthcare workers, digitalization of medical record systems, improved resource allocation, and the implementation of more effective public health strategies. These efforts are essential to reduce infection transmission and to ensure improved health outcomes for both mothers and newborns.

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