ORIGINAL ARTICLE

Factors Affecting Triple Elimination Testing Participation by the Pregnant Women During Their First Visit (K1) at *Harapan Baru* Health Center, East Kalimantan

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ABSTRACT

INTRODUCTION: Mother-to-child-transmission of HIV, syphilis and hepatitis B is a significant public health issue in Indonesia. Triple elimination screening, which tests these three infections, is a crucial strategy for early detection and prevention, ideally conducted during the first antenatal visit (K1). However, the coverage of this screening remains suboptimal in several regions, including the Harapan Baru Health Center. This study aimed to test factors affecting participation in the triple elimination screening during the first antenatal visit among pregnant women in the service area of the Harapan Baru Health Center. **MATERIALS AND METHODS:** A cross-sectional study was conducted involving 50 pregnant women who attended their K1 visit in June 2025. Participants were selected using convenience sampling. Data were gathered through structured questionnaires and maternal and child health (MCH) books and analysed using the Pearson chi-square test. **RESULTS:** Respondents' knowledge (OR=5.4, p=0.023) and health worker support (OR=10.7, p=0.002;) were significantly associated with screening participation. However, the education level was not significantly associated. **CONCLUSION:** Good knowledge level and positive support from health workers could increase the likelihood of pregnant women undergoing triple elimination screening during their first antenatal visit.

INTRODUCTION

Mother-to-child transmission (MTCT) of infectious diseases remains a major challenge to maternal and child health across various countries, including Indonesia. The primary focus is on three diseases: Human Immunodeficiency Virus (HIV), syphilis, and hepatitis B. These diseases can be transmitted through sexual contact, blood transfusion, contact with contaminated blood, and vertically from mother to child during pregnancy, childbirth, or breastfeeding. Such transmission not only leads to short-term health issues, such as miscarriage, stillbirth, and childbirth complications, but also poses long-term risks, including congenital defects, chronic diseases, and even death in infants.[1,2]

As part of a global initiative, the World Health Organization (WHO) has set a target to eliminate MTCT of HIV, syphilis, and hepatitis B by 2030. Indonesia is committed to achieving this target by implementing a policy of triple elimination screening for all pregnant women, which includes testing for HIV, syphilis, and hepatitis B at least once during pregnancy, as follows. This screening is strongly recommended to be conducted during the first antenatal visit (K1) to enable early detection and prompt management if a pregnant woman is diagnosed with reactive results[3]. The screening is a crucial part of antenatal care and is often conducted at the first visit, known as K1. The goal is to detect these infections early so that treatment can be started to protect both the mother and the unborn child.[27,25]

The implementation screening adheres to the national protocol outlined by the Indonesian Ministry of Health, primarily targeting all pregnant women during their first Antenatal Care (ANC) visit (K1) at primary health centers (Puskesmas). This protocol integrates the testing of HIV, Syphilis, and Hepatitis B into the routine ANC service, adopting an 'opt-out' approach where testing is offered unless explicitly declined. Unlike protocols in some other countries that may focus solely on HIV, the Indonesian guideline emphasizes the simultaneous screening for the three diseases (Triple Elimination). This commitment to integrated and mandatory screening highlights the high level of governmental priority given to the program; however, its successful execution continues to be hampered by local implementation gaps.[3]

Furthermore, the Indonesian Ministry of Health mandates that the triple elimination screening for HIV, Syphilis, and Hepatitis B be provided free of charge and integrated into routine Antenatal Care (ANC) at public health facilities (Puskesmas). However, screening coverage in Indonesia remains suboptimal. According to the 2023 Indonesian Health Profile, the coverage of HIV screening in pregnant women is only 68.4%, while that of syphilis is only 36.5%. These figures fall far short of the national target of 100% coverage. A similar situation is observed in East Kalimantan, where the coverage of HIV and hepatitis B screenings in pregnant women which is 87%, while syphilis screening coverage is only 43%. In Samarinda City, the statistics for 2024 were 75% for HIV, 69% for hepatitis B, and 70% for syphilis. Even at the Harapan Baru Health Center, screening coverage decreased from 65% in 2023 to 57% in 2024. This consistent underachievement, despite the service being free, suggests that the primary challenges lie in systemic and operational failures (such as supply chain issues or differences between public and private service availability) and individual-level compliance factors (such as knowledge, acceptance, or indirect costs like transportation). This decline indicates complex challenges in the program's implementation, which, if not addressed promptly, could increase the risk of mother-to-child transmission.

The low coverage of triple elimination screening is an urgent issue, as pregnant women who do not undergo screening are at a high risk of transmitting infections to their babies. HIV infection can lead to babies being born with HIV-positive diagnosis, while congenital syphilis poses the risk of permanent disabilities or death. Perinatal hepatitis B can also develop into chronic liver disease and liver cancer in adulthood.[1] Therefore, triple elimination screening participation during the first antenatal care (ANC) visit is crucial to prevent this.

Several factors influence pregnant women's compliance with screening, including education, knowledge, and support from healthcare workers. Low education levels are often associated with a lack of understanding of the benefits of screening, while good knowledge has been proven to increase awareness of the risks of transmission.[4,17] Support from healthcare workers, such as providing information and motivation from midwives or doctors, plays a crucial role in encouraging pregnant women to undergo screening.[5,18]

Several previous studies have indicated a relationship between predispositional factors and the behaviour of the triple elimination screening. Knowledge and attitudes of pregnant women have been significantly associated with triple elimination screening participation in Pekanbaru[6]. A similar result was reported by Warliana and Solihah (2023), who found that women with good knowledge were 2.73 times more likely to undergo screening than those with low knowledge. Support for healthcare workers also plays a crucial role.[7,21] Adequate knowledge among healthcare workers was also crucial for shaping positive attitudes. Therefore, it is essential to periodically assess healthcare workers' knowledge to identify and address any gaps.[22] The active involvement of healthcare workers in providing information, education, and motivation can enhance pregnant women's compliance[5]. A study in Bandar Lampung has even shown a significant relationship between healthcare worker support and screening compliance.[7] Education, as a predispositional factor, cannot be overlooked; however, several studies have yielded varied results: some found a significant relationship, while others found no association between

education and triple elimination screening.[4]

Hence, this study is essential to thoroughly identify the factors associated with compliance in triple elimination (HIV, syphilis, and hepatitis B) screening participation among pregnant women in the X region. While similar studies have been conducted in Indonesia, previous studies had certain limitations. For instance, many focused on only one disease or utilized a less comprehensive methodological design (such as small sample sizes or limited geographical reach), which made generalization of the findings difficult. This study seeks to bridge that gap by applying a more robust methodology to obtain more accurate and representative data. The findings of this study are expected to provide valuable input for healthcare workers and policymakers to formulate targeted and context-specific intervention strategies and significantly improve screening coverage. This will support the effort to achieve the target of eliminating mother-to-child transmission of HIV, syphilis, and hepatitis B by 2030.

MATERIALS AND METHODS

This study employed a quantitative approach using a correlational analytic cross-sectional design to identify factors associated with triple elimination screening during the first antenatal visit (K1) among pregnant women in the working area of Harapan Baru Health Center, Samarinda. In June 2025, a total of 57 pregnant women attended their first antenatal care (K1) visit, both with and without triple elimination testing. Using a non-probability total sampling method, all members of the population were initially included. However, seven participants were excluded due to emergencies, incomplete questionnaires, or uncooperative responses. Thus, the final sample consisted of 50 respondents who met the study criteria.

Data were collected using structured questionnaires, including a characteristics questionnaire (education), a knowledge questionnaire, and a healthcare provider support questionnaire, all of which had undergone validity and reliability testing. Secondary data were obtained from the Maternal and Child Health (MCH) handbook to determine the status of triple elimination screening. Data collection was conducted through structured interviews and review of the MCH handbook after respondents provided written informed consent.

Operational definitions included education, healthcare provider support, and triple elimination screening (whether or not HIV, syphilis, and hepatitis B screening was performed during the K1 visit).

Table I. Operational Definition

Variable	Operational Definition	Instrument	Measurement Result	Scale
Education	The formal education level and the latest diploma obtained by pregnant women	Questionnaire	Low: (< Senior High School) High: (≥ Senior High School Reference: Wiyayanti & Sutarno, 2023	Ordinal
Knowledge	Pregnant women's knowledge of triple elimination, including definition, benefits, examinations, disease transmission from mother to child, and maternal management	Questionnaire	Poor: (< 50% correct answers) b. Good: (≥ 50% correct answers) Reference: Aristadewi, 2022	Ordinal
Health worker support	Health workers' support for pregnant women in the form of education & information, counseling & communication, and access & facilities	Questionnaire	Positive support: (score ≥ 3) Negative support: (score < 3) Reference: Andhini, 2023	Ordinal
Triple elimination test	Pregnant women's action in undergoing triple elimination test (HIV, syphilis, hepatitis B) during the first antenatal care visit (K1)	Maternal and Child Health Book (KIA)	Yes: underwent triple elimination test during K1 b. No: did not undergo triple elimination test during K1	Nominal

Data analysis consisted of univariate analysis to describe frequency distributions, followed by bivariate analysis using the chi square test for education and knowledge variables, and Fisher exact test for healthcare provider support, with a significance level of α=0.05. Odds ratios were calculated to determine the magnitude of association between variables.

Research ethics were upheld through the principles of confidentiality, justice, and voluntary participation. This study received ethical clearance from the Health Research Ethics Committee of Poltekkes Kemenkes Medan, under approval number No. 01.26.1027/KEPK/POLTEKKES KEMENKES MEDAN 2025. To ensure informed consent, all prospective respondents were thoroughly briefed on the study's purpose, procedures, potential risks, and their right to withdraw at any time without penalty. Following this explanation, respondents who agreed to participate provided written informed consent prior to data collection. Confidentiality was strictly

maintained by anonymizing all collected data, assigning unique numerical codes to replace personal identifiers, and storing the data securely in a password-protected file accessible only to the primary researcher.

RESULT

The results of this study describe the distribution of respondent characteristics, including education level, knowledge, healthcare worker support, and triple elimination screening during the first antenatal visit to the Harapan Baru Health Center, Samarinda City. Additionally, an analysis of the relationships between the studied variables is presented.

Table II. Respondents Characteristics (n=50)

Variable	Frequency (n)	Percentage (%)
Age		
<20 years	2	4
20-35 years	42	84
> 35 years	6	12
Occupation		
Unemployed	45	90
Employed	5	10
Education Level		
Basic	19	38
Higher	31	82
Knowledge level		
Good	18	36
Poor	32	64
Healthcare Worker Support		
Positive	38	76
Negative	12	24
Triple Elimination Screening Participation		
Yes	36	72
No	14	28

Based on Table 2, it can be observed that the majority of respondents are aged between 20 and 35 years (42/50, 84%), and were unemployed (45/50, 90%), have a higher education level (31/50, 62%) with good knowledge (32/50, 64%), had received positive healthcare worker support (38/50, 76%) and had undergone triple elimination screening (36/50, 72%).

Table III. Association between educational level, knowledge and healthcare worker support with Triple elimination screening participation

Variable	Triple Elimination Screening Category				OR (95%CI)	P value
	Yes		No			
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)		
Education Level					0.560 (0.147, - 2.129)	0.595
Basic	21	68	1	32		
Higher	15	79	4	21		
Missing						
Knowledge level					5.400 (1.431, 20.382)	0.023*
Good	27	84	5	16		
Poor	9	50	9	50		
Healthcare Worker Support					10.667 (2.420, 47.023)	0.002*
Positive	32	84	6	16		
Negative	4	33	8	67		

Based on Table 3, it was shown that among women with higher education, 68% had underwent triple elimination screening during K1, when compared to the one with basic education, 4 respondents (21%) did not undergo the screening with no significant relationship found between education level and triple elimination screening during the K1.

There was a significant relationship between knowledge level and triple elimination screening (p=0.023) during the K1 by pregnant women at Harapan Baru Health Center. The odds ratio (OR) was 5.4, indicating that respondents with good knowledge had 5.4 times odds to undergo triple elimination screening compared to those with poor knowledge.

Similarly, it was found that there was a significant relationship between healthcare worker support and triple elimination (p=0.002) screening during the K1. The odds ratio (OR) was 10.7, indicating that respondents with positive healthcare worker support had 10.7 odds to undergo triple elimination screening compared to those with negative healthcare worker support.

DISCUSSION

The results of this study indicate that most pregnant women respondents underwent triple elimination screening during their first antenatal visit (K1). Multiple studies have shown that while there has been an increase in the number of pregnant women undergoing triple elimination screening at their first antenatal care visit (K1), the coverage often remains below national and international targets[23]. Research, particularly in countries like Indonesia, reveals a mixed picture. While some studies show a high percentage of pregnant women getting screened, the results are often not uniform across all three diseases. For example, a study in Makassar City, Indonesia, found that in 2022, 99.4% of pregnant women had an HIV test, but only 87.3% were screened for syphilis and 56% for hepatitis B. This suggests that even when a woman goes for her K1 visit, she may not receive the full "triple" screening.[24]

The findings also emphasised the importance of

**p level of<0.05 taken as level of significance*

knowledge as a factor closely related to triple elimination screening participation. Pregnant women with good knowledge were more likely to be aware of the risks of HIV, syphilis, and hepatitis B transmission to the foetus, which motivated them to undergo screening. This finding is consistent with Dyna et al. (2023), who stated that maternal knowledge was significantly associated with triple elimination screening[10]. Similar research by Sinaga et al. (2022) found that the knowledge, attitudes, and actions of pregnant women were significantly related to triple elimination screening[11]. Good knowledge enables pregnant women to make informed health decisions, including screening in the early stages of pregnancy.

The results of this study further emphasise the critical role of healthcare worker support in enhancing pregnant women's compliance with triple elimination screening. Pregnant women who received positive support from healthcare workers were more likely to comply with screening. This finding aligns with the study by Veronika et al. (2023), who identified a significant relationship between healthcare worker involvement and triple elimination screening at the Palembang Health Center.[12] Similarly, Ellen, Sari, and Wulandari (2024) underscored the central role of healthcare workers in improving pregnant women's compliance through education, motivation, and counseling[5]. Rohani et al. (2022) emphasised that healthcare worker support goes beyond providing information and serves as emotional support that significantly influences pregnant women's decisions to undergo screening.[8]

Community-based approaches have also proven effective in enhancing pregnant women's knowledge and attitudes. Fatiah et al. (2024) demonstrated that health education at Posyandu (community health posts) significantly improved pregnant women's perceptions, attitudes, and knowledge regarding the importance of triple elimination services[13]. This finding underscores the importance of community-based interventions as a key strategy for reaching pregnant women, particularly those residing in areas with limited access to healthcare facilities.

In addition to individual factors and healthcare worker support, systemic factors play a significant role in the success of the triple elimination program. An evaluative study by Syaputri et al. (2023) in Rokan Hilir revealed that limited midwifery competencies, insufficient health promotion, and weak supportive policies are serious barriers to achieving national screening targets.[14] In line with this, Mramel et al. (2024) stated that opportunities to fully experience the breadth of midwifery skills were limited. Additionally, most midwifery students and recent graduates exhibit insufficient competence in handling high-risk situations and emergencies.[20] Limited resources in health facilities, such as a shortage of rapid test kits or trained staff was another influence factor.[25] These findings indicate that to improve the coverage of triple elimination screening, a comprehensive approach is needed, involving education, healthcare worker training, and regulatory and policy support.

Overall, this study reaffirms that knowledge and healthcare worker support play a significant role in enhancing triple elimination screening compared to formal education. This was consistent with Green's (1980) Health Belief Model, which posits that health behaviour is determined by predispositional factors (knowledge, attitudes), enabling factors (facilities, access to services), and reinforcing factors (support from healthcare workers, family, and the environment).[15] This indicates that a majority of pregnant women are not consistently receiving the full screening.[26] The practical implication of this study is the need to strengthen continuous health education programs for pregnant women, particularly regarding the risks of HIV, syphilis, and hepatitis B transmission, as well as the importance of early detection through triple elimination screening. Furthermore, the role of healthcare workers needs to be enhanced, not only as service providers but also as motivators and companions in the decision-making process for pregnant women.[16,19]

Finally, education level was not significantly associated with the triple elimination screening. This lack of a significant relationship could be explained by the health behaviour concept, which states that education is merely one predispositional factor and not the primary

determinant of behaviour (Notoatmodjo, 2014). Even though pregnant women may have higher education, it does not necessarily guarantee compliance with screening if their knowledge about triple elimination is low or if there is no support from their surroundings. This finding aligns with Marwini's (2023) study, which concluded that maternal education had no significant effect on the implementation of triple elimination screening.[4] This suggests that specific information plays a more crucial role in influencing behaviour than formal education.

Therefore, strategies to increase the coverage of triple elimination screening should focus on comprehensive education, community-based approaches, improving healthcare worker competency, and regulatory support. If these strategies are implemented effectively, the national target of eliminating mother-to-child transmission of HIV, syphilis, and hepatitis B by 2030, as directed by the WHO and the Ministry of Health of the Republic of Indonesia, will be achieved.

CONCLUSION

The findings of this study indicate that maternal knowledge and healthcare provider support are significantly associated with the uptake of triple elimination screening during the first antenatal visit (K1), with p=0.023 (OR=5.4) and p=0.002 (OR=10.667), respectively. Conversely, formal educational attainment demonstrates no significant relationship with screening participation (p=0.595). These results underscore that higher maternal education does not inherently ensure compliance with triple elimination screening in the absence of condition-specific knowledge and adequate professional support.

The discussion highlights that knowledge functions as a critical predisposing factor shaping health related behavior, wherein women with sufficient knowledge exhibit greater awareness of the risks of vertical transmission of HIV, syphilis, and hepatitis B. Healthcare provider support emerges as the most influential reinforcing factor, as providers contribute not only to the dissemination of information but also to the provision of motivational cues that facilitate early detection. The limited influence of formal education suggests that strategies to enhance screening uptake should prioritize structured, targeted health education interventions and more active engagement from healthcare professionals.

In conclusion, adequate maternal knowledge and strong healthcare provider support substantially increase the likelihood of pregnant women undergoing triple elimination screening at the initial antenatal visit. Strengthening maternal health education through ongoing counseling and evidence based educational media, both within primary care settings and community-based platforms, is recommended. Healthcare providers are further encouraged to adopt a more proactive role in delivering comprehensive informational and emotional support throughout antenatal care.

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CONFLICT OF INTEREST

The authors declare no conflict of interest related to this study.

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