



ASSESSING KNOWLEDGE ABOUT MOTHER-TO-CHILD TRANSMISSION OF HIV/AIDS AMONG MARRIED WOMEN IN INDONESIA

Desy Nuri Fajarningtiyas*, Sari Kistiana

Research Center for Population, National Research and Innovation Agency, Indonesia

Email: desynuree@gmail.com

* Corresponding author

Article Info

Keywords:
Comprehensive;
HIV/AIDS;
Knowledge;
Knowledge of MTCT;

Abstract

Background: The transmission of HIV/AIDS will affect not only women but also their families, including their children's health and future. Given the quite high rates of vertical transmission as well as early infant transmission, understanding mother-to-child transmission (MTCT) of HIV/AIDS is important for women. **Objective:** This study aims to examine knowledge about the MTCT of HIV/AIDS among married women and the contributing factors. **Method:** A weighted sample of 35,479 married women aged 15-49 was drawn from the 2017 Indonesia Demographic and Health Survey. Binary logistic regression for complex sample design was used to examine the associated factors of HIV/AIDS MTCT. **Result:** Overall, only 58.6% of women had good knowledge of HIV/AIDS MTCT. Women with a comprehensive knowledge of HIV/AIDS (OR: 7.27, 95% CI:6.75-7.83), aged ≥ 35 years (OR:1.33, 95% CI:1.19-1.47), attaining at least secondary education level (OR:1.85, 95% CI:1.71-1.99), having an educated husband (OR: 1.28, 95% CI: 1.11-1.47), coming from richer family (OR:1.41, 95% CI: 1.29-1.54), and residing in urban areas (OR: 1.23, 95% CI:1.13-1.33) tend to have better knowledge of HIV/AIDS MTCT. **Conclusion:** Enhancing comprehensive knowledge of HIV/AIDS among women and men through both formal and informal education curricula is expected to increase knowledge about MTCT of HIV/AIDS.

This is an open-access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Received 3/06/2024

Revised 24/06/2024

Accepted 28/06/2024

How to Cite:

Fajarningtiyas DN, Kistiana S. KNOWLEDGE OF MOTHER-TO-CHILD TRANSMISSION OF HIV/AIDS AND THE ASSOCIATED FACTORS IN INDONESIA. J. Kesehat. Reproduksi [Internet]. 2024 Jun. 30;15(1):1-15. Available from: <https://doi.org/10.58185/jkr.v15i1.190>

INTRODUCTION

Despite the continued decline in new Human Immunodeficiency Virus (HIV) infections which went from 50,000 in 2010 to 39,000 and 27,000 in 2015 and 2021, respectively,¹ the government of

Indonesia still faces an imperative challenge in this circumstance. The proportion of HIV/AIDS cases increases substantially among Indonesian housewives. It is estimated that 35% of housewives were infected by the virus.² Immediate action should be taken seriously to reduce the prevalence since it will affect not only women but also their families, including their children's health and future. Although indicating a reduction, recent data showed a high vertical transmission (transmission from mother to children/MTCT) rate, which stood at 30.8% in Indonesia.¹ MTCT has been identified as the main source of HIV infections amongst children under the age of 15.³ As much as 3,200 of 27,000 new HIV infections occurred among children aged 0-14 years.¹ It places children at a disadvantage in terms of exposure to infection and contributes to child morbidity and mortality.⁴

HIV is transmitted vertically through pregnancy, delivery, and breastfeeding. The awareness of this transmission remains low, contrarily many women have been infected by the virus during pregnancy or breastfeeding.⁵ Thus, preventing vertical transmission is crucial. The increase in the proportion of transmission to infants is attributed to higher maternal viral loads suggesting that infected mothers are prone to transmit the infection to their children.⁶ Previous studies revealed that most women do not know that a longer duration of breastfeeding among HIV/AIDS-infected women raises the likelihood of HIV transmission.^{7,8} Nonetheless, a recent guideline on infant feeding and HIV by UNICEF and WHO confirmed that the risk of transmission is getting lower with adherence to antiretroviral therapy (ART) uptake,⁹ which works to regulate the proliferation of the virus.¹⁰ Prior research also proved the decline of vertical transmission as a result of ART use among HIV-infected pregnant women.^{8,11,12}

Furthermore, other studies found that comprehensive knowledge of HIV/AIDS and prevention of MTCT (PMTCT) contribute to encouraging ART uptake.^{8,13} As good knowledge of MTCT will ensure the effectiveness of PMTCT interventions,^{7,14,15} providing MTCT knowledge is expected to raise awareness of the essentials of ART uptake and reduce the risk of transmission.⁴ In addition, having good knowledge of HIV transmission is associated with more acceptance of HIV testing.¹⁶ Most women are reluctant to have HIV testing due to the fear of unveiling their HIV status, however, there is a tendency of openness among those who are knowledgeable of the transmission.¹⁷ Thus, enhancing knowledge of MTCT is also important to increase awareness of HIV testing which is one of PMTCT interventions. Moreover, a study in South Africa disclosed that women with poor knowledge of MTCT are likely to disobey the follow-up of PMTCT services,^{4,18} suggesting the importance of the contributions of MTCT knowledge to the uptake of PMTCT intervention.

Knowledge of MTCT among women is associated with several factors. Some studies highlight the positive correlation between comprehensive knowledge of HIV/AIDS and MTCT knowledge suggesting having good knowledge of HIV/AIDS increases the possibility of having better knowledge of MTCT.^{7,14} In addition to socio-demographic factors, including women's age, education

level, working status, exposure to media, socioeconomic status, and place of residence,^{7,10,14,19–22} women's decision-making power, which indicates the ability to express their voice related to crucial decisions, including reproductive health, also influence knowledge of MTCT.²³ Moreover, related to lack of power, women often face difficulties in accessing healthcare services including preventive care for HIV/AIDS.²⁴ This may affect exposure to the knowledge of MTCT.

There have been several studies examining the MTCT of HIV/AIDS in Indonesia. However, these focus mostly on the prevention of the transmission strategies and are limited to the health facilities setting, so they involve a relatively small number of samples. This current study tries to provide a broader picture yet specifically points to the knowledge of MTCT among married women in Indonesia using large national survey data. Besides, the study will examine the contribution of such factors that hypothetically influence the knowledge of MTCT, including comprehensive knowledge of HIV/AIDS, decision-making power, barriers to accessing healthcare services, and some socio-demographic characteristics. The finding is expected to be taken into consideration in promoting effective prevention of HIV/AIDS vertical transmission.

METHODS

This current study employed a cross-sectional design using individual women's data drawn from the 2017 Indonesia Demographic and Health Survey (IDHS). The survey yielded national and provincial levels of data estimation, which used a two-stage stratified sample design. In the first stage, the 2010 Population Census Master was used to choose several census blocks for systematic probability proportional to size (PPS). In the second stage, 25 ordinary households were selected using systematic sampling based on the updated household list in every census block.

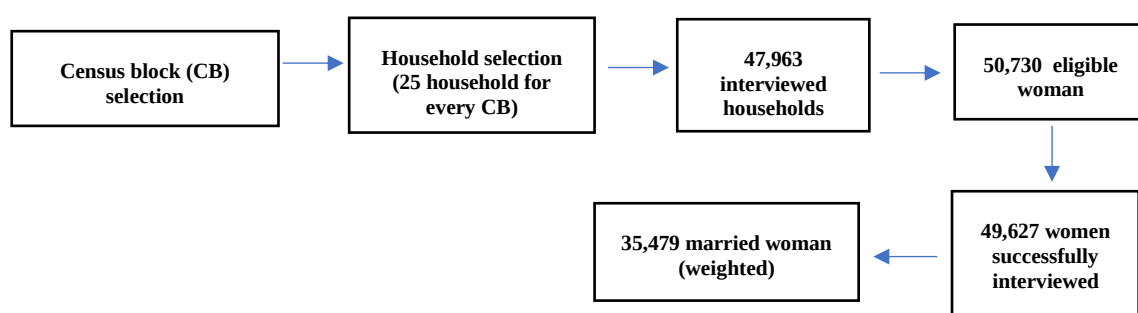


Figure 1. Sample selection process

There were 47,963 successfully interviewed households, and 50,730 women were found eligible for individual interviews. With a response rate of 98%, the survey completed the interview for 49,627 women aged 15-49. Based on an unweighted data sample, there were 34,086 married

women aged 15-49, whereas according to the weighted data sample, there were 35,479 married women aged 15-49 which was used as the unit analysis of this study.

The outcome variables of this study was the knowledge of MTCT of HIV/AIDS among married women. This variables was a composite score constructed from three questions of the 2017 IDHS questionnaire to measure women's knowledge of MTCT, consisting of whether HIV/AIDS can be transmitted from mother to baby during pregnancy, during delivery, and during breastfeeding or not. Women who answered "yes" to all three questions were considered to have good knowledge of MTCT and coded as "1". Otherwise, they were considered to have poor knowledge and coded as "0", including women who answered "don't know" as well as missing values. As mentioned in the DHS statistical guide, the questions about MTCT knowledge were only asked to those who knew about HIV/AIDS, so the missing values on the questions about MTCT knowledge referred to this, meaning that women who did not know about HIV/AIDS were assumed to not know MTCT.²⁵

The predictors comprised comprehensive knowledge of HIV/AIDS, decision-making power, barriers to accessing healthcare services, and several socio-demographic indicators, including age, women's education, husbands' education, working status, wealth index, and place of residence. The variables of comprehensive knowledge of HIV/AIDS was composited from seven questions consisting of knowledge of transmission (knowing that a healthy-looking person can have HIV/AIDS; HIV/AIDS cannot be transmitted by mosquitoes; HIV/AIDS cannot be transmitted by supernatural means; HIV/AIDS cannot be transmitted by sharing food; and people may get HIV/AIDS by sharing a needle and syringe) and knowledge of prevention (HIV/AIDS can be prevented by using a condom during sex and having one sexual partner only). Every correct answer to each question was scored "1", otherwise was scored "0", and then summed up. Women with a total score of 3 or less (50% of total correct answers) were categorized as having poor knowledge and coded "0", and vice versa.

The decision-making power variables was composed of three questions (the person who determined the decision about the respondent's health, large household purchases, and visiting a family). For each question, women who determined the decision by themselves were categorized as having high power in decision-making and coded as "3". Those who determined jointly with their husbands were classified as having medium power and coded as "2". Those who determined the decision by their husbands or other people only were categorized as having low power in decision-making and coded as "1". The total score was obtained by summing up the three scores of each woman. Since the maximal score of the correct answer was 9 (every answer had the same score which was 1) and the minimal score was 3, women with a total score ranging from 1 to 3 were coded as "1" (low power in decision-making), those with a total score ranging from 4 to 6 were coded as "2"

(medium power in decision-making), and those with a total score ranging from 7 to 9 were coded as “3” (high power in decision-making).

The variables of barriers to accessing healthcare services were constructed from the four questions related to problems of having permission from the husband to go for treatment, money for treatment, distance to the health facilities, and not wanting to go to the services alone. Women who had at least one problem with the four questions were classified as having a big problem and coded as “1”, otherwise they were classified as having no problem and coded as “0”.

Descriptive analysis was employed to present the prevalence of MTCT knowledge as well as the frequency distribution of the respondents based on socio-demographic background and other factors, including comprehensive knowledge of HIV/AIDS, decision-making power, and barriers to accessing healthcare facilities. Bivariate logistic regression analysis was conducted to examine the association of each predictor with the MTCT knowledge of HIV/AIDS. Finally, the selected variables of the result of the bivariate analysis were involved in the multivariate logistic regression analysis. Considering the complex nature of the IDHS data, the data analysis of this current study employed the complex sample design analysis. All the analysis was conducted using IBM SPSS 20 software.

Since the 2017 IDHS is part of the Demographic and Health Survey (DHS) Program implemented by ICF International, the ethical approval of data collection was provided by the ICF International Review Board (FWA00000845). Moreover, the 2017 IDHS data did not include any personal identity. Hence, this current study did not provide ethical clearance.

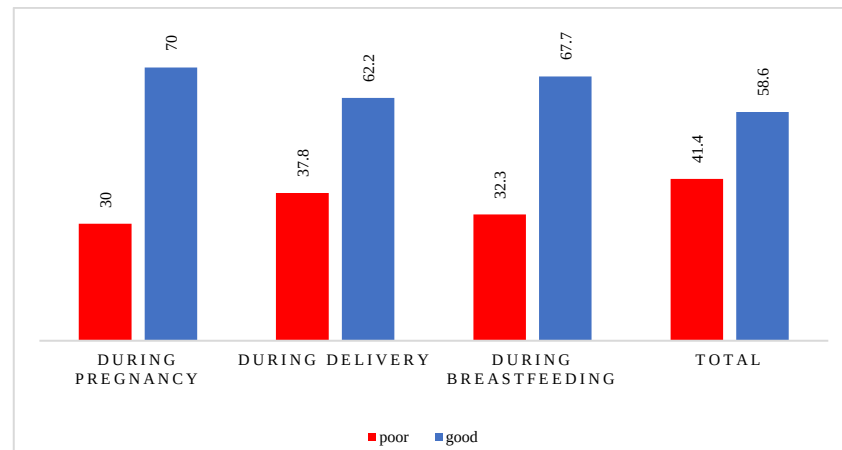
RESULTS

Characteristics of the respondents

Table 1 presents the socio-demographic characteristics of the respondents. More than 54% of the respondents were women aged 35 or more, while those who were in the youngest age group (15-24) composed only 11.1% of the respondents. Around 52% of the respondents attained a secondary education level, and the figure was relatively the same as the husband’s education (52.8%). Most of the respondents were employed (61.6%), from rich households (41.9%), and lived in rural areas (51.5%).

Knowledge about the MTCT of HIV/AIDS

Overall, only 58.6% of respondents had good knowledge about the transmission of HIV/AIDS (Figure 1). Around 67.7% and 70% of respondents knew that the transmission of HIV/AIDS could occur during breastfeeding and pregnancy, respectively. Among the three indicators of MTCT, the transmission of HIV/AIDS during delivery was the least understood by respondents, with only 62.2% of the respondents having good knowledge of it.

**Figure 1.** Knowledge of MTCT of HIV/AIDS**Table 1.** Socio-demographic characteristics of respondents, Indonesia 2017

Variables	Frequency	Percentage (%)
Age		
15-24	3,939	11.1
25-34	12,046	34.0
≥35	19,494	54.9
Women's Education		
Primary or less	12,669	35.7
Secondary	18,453	52.0
Higher	4,357	12.3
Husbands' education		
Primary or less	12,529	35.2
Secondary	18,710	52.8
Higher	4,240	12.0
Working status		
Not working	13,642	38.4
Working	21,837	61.6
Wealth index		
Poor	13,228	37.3
Middle	7,369	20.8
Rich	14,881	41.9
Place of residence		
Urban	17,222	48.5
Rural	18,257	51.5
Total	35,479	100.0

Knowledge of HIV/AIDS, barriers to accessing healthcare services, and decision-making power among married women 15-49 years

Table 2 shows the percentage distribution of knowledge of HIV/AIDS, barriers to accessing healthcare services, and decision-making power among the respondents. Around 6 of 10 married women aged 15-49 years had comprehensive knowledge of HIV/AIDS. The study also revealed that more than 55% of the respondents had moderate decision-making power. Accessing healthcare services did not appear to be a big problem for the majority of respondents (98.1%).

Table 2. Knowledge of HIV/AIDS, barriers to accessing healthcare services, and decision-making power among respondents, Indonesia 2017

Variables	Frequency	Percentage (%)
Comprehensive knowledge of HIV/AIDS		
Poor	14,690	41.4
Good	20,789	58.6
Decision-making power		
Low	1,438	4.1
Moderate	19,804	55.8
High	14,237	40.1
Barriers to accessing healthcare services		
Big problem	3,717	1.9
Not a big problem	31,762	98.1

Knowledge about MTCT of HIV/AIDS based on respondents’ characteristics

Table 3 presents the cross-tabulation of knowledge of MTCT of HIV/AIDS and predictors variables. Married women with good knowledge about MTCT of HIV/AIDS were dominated by those who had comprehensive knowledge of HIV/AIDS, had higher power in decision-making, had no barriers to accessing healthcare services, were from older age groups, attained higher education level of themselves and their husbands, were unemployed, were from richer households, and lived in urban areas.

Association of comprehensive knowledge of HIV/AIDS, decision-making power, barriers to accessing healthcare services, and socio-demographic characteristics with knowledge of HIV/AIDS MTCT. The bivariate regression analysis shows that comprehensive knowledge of HIV/AIDS, decision-making power, barriers to accessing healthcare services, age, women’s education, husbands’ education, wealth index, and place of residence were significantly associated with knowledge of the MTCT of HIV/AIDS (Table 4). However, multivariate analysis confirms that decision-making power and barriers to accessing healthcare services no longer influenced the knowledge of MTCT after being controlled by other variables.

The study discloses that women who were knowledgeable on comprehensive HIV/AIDS were 7.27 times (95% CI: 6.75–7.83) more likely to have good knowledge of MTCT of HIV/AIDS than those who had poor knowledge of HIV/AIDS. The likelihood of women’s education decreased among women with higher levels of education compared to those with secondary education levels, however, these were higher than those who only completed primary education or were illiterate. Women with secondary education levels had 1.85 higher odds of MTCT knowledge than those who were with lower education levels (95% CI: 1.71–2.00). Women who attained higher education levels had 1.79 higher odds than those who were with lower education levels (95% CI: 1.56–2.05). Furthermore, Women’s socioeconomic status also appears to have a positive effect on MTCT knowledge. Women who were from middle-wealth index families were 1.31 times more likely to have better knowledge than their counterparts (95% CI: 1.19–1.44). Women who were from richer

families were 1.41 times more likely to have better knowledge than their counterparts (95% CI: 1.29–1.54).

Table 3. Percentage distribution of knowledge of MTCT of HIV/AIDS based on respondents' characteristics

Variables	Knowledge of MTCT of HIV/AIDS	
	Poor (%)	Good (%)
Comprehensive knowledge of HIV/AIDS		
Poor	10,388 (71.7)	4,109 (28.3)
Good	4,303 (20.5)	16,680 (79.5)
Decision-making power		
Low	783 (54.5)	655 (45.5)
Moderate	8,334 (42.1)	11,471 (57.9)
High	5,573 (39.1)	8,663 (60.9)
Barriers to accessing healthcare services		
Big problem	335 (51.0)	322 (49.0)
Not a big problem	14,355 (41.2)	20,467 (58.8)
Age		
15-24	1,719 (43.6)	2,220 (56.4)
25-34	4,579 (38.0)	7,467 (62.0)
≥35	8,392 (43.0)	1,1102 (57.0)
Women's Education		
Primary or less	7,851 (62.0)	4,818 (38.0)
Secondary	5,897 (32.0)	12,556 (68.0)
Higher	942 (22.0)	3,415 (78.4)
Husbands' education		
Primary or less	7,240 (57.8)	5,289 (42.2)
Secondary	6,480 (34.6)	12,230 (65.4)
Higher	971 (23.0)	3,269 (77.1)
Working status		
Not working	5,589 (41.0)	8,053 (59.0)
Working	9,101 (41.7)	12,736 (58.3)
Wealth index		
Poor	7,497 (56.7)	5,731 (43.3)
Middle	2,988 (40.5)	4,381 (59.5)
Rich	4,205 (28.3)	10,676 (71.7)
Place of residence		
Urban	5,499 (31.9)	11,723 (68.1)
Rural	9,191 (50.3)	9,066 (49.7)

The likelihood of having good knowledge of MTCT increased as women's age increased. Women from the age groups of 25-34 and 35 years and older were 1.26 and 1.33 times more likely to have good knowledge of MTCT, respectively (95% CI: 1.13–1.39 and 1.19–1.47). Moreover, women whose husbands completed higher education levels were 1.28 times more likely to have good knowledge of MTCT (95% CI: 1.11–1.47). Women whose husbands attained secondary education level were 1.26 times more likely to have good knowledge of MTCT (95% CI: 1.16–1.36). Women who lived in urban areas were 1.23 times more likely to have a good knowledge of MTCT compared to their counterparts (95% CI: 1.13–1.33).

Table 4. Logistic regression model for the predictors of MTCT knowledge of HIV/AIDS

Variables	COR (95% CI)	AOR (95% CI)
Comprehensive knowledge of HIV/AIDS		
Poor	1	1
Good	9.79* (9.11 - 10.54)	7.27* (6.75 - 7.83)
Decision-making power		
Low	1	1
Moderate	1.65* (1.41 - 1.92)	1.13 (0.95 - 1.34)
High	1.86 (1.59 - 2.17)	1.19 (1.00 - 1.44)
Barriers to accessing healthcare services		
Big problem	1	
Not a big problem	1.48* (1.16 - 1.91)	1.04 (0.81 - 1.33)
Age		
15-24	1	1
25-34	1.26* (1.15 - 1.38)	1.26* (1.13 - 1.39)
≥35	1.03 (0.94 - 1.12)	1.33 (1.19 - 1.47)
Women's Education		
Primary or less	1	1
Secondary	3.47* (3.23 - 3.72)	1.85* (1.71 - 2.00)
Higher	5.91 (5.32 - 6.57)	1.79 (1.56 - 2.05)
Husbands' education		
Primary or less	1	1
Secondary	2.58* (2.41 - 2.77)	1.26* (1.16 - 1.36)
Higher	4.61 (4.14 - 5.13)	1.28 (1.11 - 1.47)
Working status		
Not working	1	-
Working	0.97 (0.91 - 1.03)	-
Wealth index		
Poor	1	1
Middle	1.92* (1.76 - 2.09)	1.31* (1.19 - 1.44)
Rich	3.32 (3.06 - 3.60)	1.41 (1.29 - 1.54)
Place of residence		
Rural	1	1
Urban	2.16* (1.98 - 2.35)	1.23* (1.13 - 1.33)

Note: * Statistically significant at p-value ≤ 0.05

OR = Odds Ratio, aOR = Adjusted Odds Ratio, CI = Confidence Interval

Source: Computed by the author from IDHS 2017

DISCUSSION

This study aims to examine the knowledge of MTCT of HIV/AIDS among married women aged 15-49 years and its associated factors. The finding showed that nearly half (41.4%) of the women had poor knowledge of how HIV is transmitted from mother to child and only 58.6% had good knowledge. Previous studies revealed the same situation that the prevalence of MTCT knowledge ranges from 50% to 58% in regions like North India, Iran, and sub-Saharan Africa (SSA) countries.^{7,19,21,22} The prevalence indicates the need to improve knowledge of vertical transmission among women in these countries. Indeed, it is a challenge for the government to enhance the number of women exposed to information about MTCT as well as the level of knowledge of MTCT since the PMTCT program will be successful if the knowledge of MTCT is well-perceived.^{18,26}

Even though there is no striking difference in knowledge of transmission mode, more women had poor knowledge that HIV/AIDS could be transmitted during delivery. This finding contradicts some previous research findings that found most women did not know breastfeeding as the

transmission method.^{7,20} Many women in Indonesia did not know that infection posed by women with HIV could be transferred to their babies during delivery. A prior study in Iran found that only 22% of women knew that a cesarean section reduces the likelihood of HIV/AIDS transmission.²⁷ Having timely labor, under supervision, and controlled by health workers will also prevent the virus from infecting the babies as soon as possible.²⁸ It shows that making sure every woman receives Antenatal care (ANC) services and delivers her baby in the health facility is crucial. During ANC services women are commonly exposed to such information, not only about the pregnancy itself but also about vertical transmission mode and its prevention, including HIV testing and ART uptake, especially for infected women.

Comprehensive knowledge of HIV/AIDS, which was measured by some indicators related to misconceptions as well as myths about HIV/AIDS, was found to be positively associated with knowledge of MTCT. This finding corresponds with other studies that women with comprehensive knowledge of HIV/AIDS had better knowledge of MTCT.^{7,14} Knowing about HIV/AIDS comprehensively means less misconception, so women may have a better understanding of HIV/AIDS transmission from mother to child. Given that comprehensive knowledge of HIV/AIDS had the highest likelihood of the increase of MTCT knowledge of HIV/AIDS, it is suggested that enhancing comprehensive knowledge of HIV/AIDS is important to diminish misconceptions and expose women to HIV/AIDS transmission-related information.

A positive association of women's age with knowledge of MTCT indicates a better understanding of vertical transmission respecting the older age group. It is consistent with some previous studies.^{20,29} A possible explanation is that older women may have a better understanding of the vertical transmission, as the consequences of higher exposure to information obtained from and experience with various maternal healthcare (MHC) services, including ANC.^{19,22} Contrarily, younger women may have fewer opportunities to visit MHC services since, normally, they only have fewer pregnancies and fewer children compared to their counterparts. A study disclosed that women aged 30 years and older in Indonesia were two times more likely to use MHC services than the younger.³⁰ This supports the notion of a higher possibility of exposure to such information from MHC services among older women. Increasing the awareness of the importance of ANC visits as well as MHC services utilization among younger women is supposed to increase their knowledge regarding HIV vertical transmission.

Regarding education, this study is in concordance with other studies suggesting women's education showed a positive relationship with MTCT knowledge,^{10,19,21–23,31,32} even though among women who completed secondary education, the odds ratio was slightly higher than those who completed higher education. The role of education in the improvement of knowledge of MTCT is not only related to the ability to perceive reproductive health education easily but is also associated

with better occupation and income.^{22,23,32} That is why the finding from a study in Rwanda found an inverse association between educational level and knowledge of MTCT.³ Women with better occupations may earn greater income, so they may have more opportunities to access MHC services through ANC and Postnatal care (PNC) services, and to be exposed to various information, including HIV/AIDS transmission and its prevention.²³ Moreover, education is associated with the awareness of the utilization of MHC services. A study reported that the number of ANC and PNC visits as well as the number of women giving birth in health facilities rise as women's education level increases.³⁰ Another study revealed that women with adequate knowledge of MTCT were more likely to use ANC services.³³ Hence, education is important either as a direct or indirect factor of MTCT knowledge.

Although prior studies failed to prove the correlation between husbands' education levels and women's knowledge of MTCT^{20,23}, this current study found higher spousal education contributed to an increase in women's knowledge about MTCT of HIV/AIDS. In many patriarchal societies like Indonesia, husbands have a significant role in the decision-making process related to women's reproductive health as well as the utilization of maternal health care services. Educated husbands, contrarily, may tend to respect their wives, and have an open mindset allowing the discussion regarding safer sex, including preventing HIV/AIDS transmission, and supporting their wives to acquire MHC and RH services. A study in Indonesia disclosed that a higher level of husbands' education doubles the probability of women receiving maternal care intervention.³⁰ Furthermore, global HIV prevention currently also emphasizes HIV prevention in married and stable relationships since the prevalence of transmission is high among spousal relationships.³⁴ Therefore, to lower the prevalence of HIV transmission, it is important to improve spousal education.

In line with several prior studies, this study demonstrated that knowledge of MTCT is attributed to socioeconomic factors.^{19,21,23} Women with higher socioeconomic status had better knowledge of MTCT than other women. They tend to have better access to RH and MHC services, including access to transportation, and addressing geographic barriers due to distanced health facility issues, so they have better exposure to such information obtained from the services.^{19,23} The higher socioeconomic status also allows women to have more opportunities to educate themselves from any sources, including the media.^{21,23} Media exposure determines women's attitudes and behaviors as well as their decisions to advance their knowledge.³⁵ Thus, richer women will be well exposed to such media, gain knowledge, and be able to improve their awareness by visiting RH and MHC facilities and having access to any services and information related to HIV/AIDS transmission.

This study confirmed many previous studies that women living in urban areas had higher knowledge of MTCT than their counterparts.^{3,14,21,22,24,26,31,32} In fact, knowledge of HIV/AIDS vertical transmission is important to be perceived by everyone regardless of their residence. A possible

explanation might be the benefit of convenient access to RH and MCH services.^{21,26,32} A study reported that rural women are likely to experience misinformation because much information is centralized in cities and urban residents might have better access to mass media, resulting in low awareness of knowledge.^{3,21,24} Besides, urban dwellers commonly have higher education levels²¹ and are likely to seek out any information they need independently. Other than accessibility factors, knowledge of MTCT is influenced by sociocultural issues, which are related to the place of residence. Stigma and misconceptions prevailing in rural areas influence the perception of the urgency of obtaining RH and MCH-related services, leading to reluctance to acquire the services.²⁴ Ensuring the provision of education about vertical transmission and HIV/AIDS-related information among rural dwellers through, for example, premarital counseling, which is an obligation for expectant brides in Indonesia, is expected to increase their knowledge of MTCT as well as its prevention.

Due to the scarcity of comprehensive HIV/AIDS data available in Indonesia, the use of 2017 IDHS data should be interpreted with caution since it might not illustrate the current situation. Moreover, since the data is cross-sectional, the causal relationships were unable to be performed. Nevertheless, considering the large sample of respondents, this study ensured powerful statistical analysis. Additionally, the use of weighted data as well as a complex sample design minimize sample bias and estimation, ensuring the general population is representative.

CONCLUSION

This study confirmed that knowledge of MTCT of HIV/AIDS among married women in Indonesia was still low. Considering the transmission mode, delivery was the least knowledge of MTCT perceived by the respondents. Having a comprehensive knowledge of HIV/AIDS, being from an older age group, completing secondary or higher education level, having a higher educated husband, being from a richer family, and living in urban areas were associated with good knowledge of MTCT of HIV/AIDS.

RECOMMENDATION

Enhancing comprehensive knowledge of HIV/AIDS among women and men through both formal and informal education curricula is important to increase knowledge about MTCT of HIV/AIDS, as well as improve men's involvement in the prevention of MTCT. Elaborate and rigorous campaigns using mass and social media about MTCT of HIV/AIDS is another key to increasing knowledge. It is also necessary to ensure the provision of premarital counseling in the related institution. Providing and delivering information, education, and communication on HIV/AIDS comprehensively, in an accessible and easy-to-understand manner, specifically among vulnerable groups: those who are younger, have lower education, are from disadvantaged families, and live in rural areas. Furthermore, encouraging health workers and family planning workers to

persuade pregnant women to visit healthcare to have complete ANC, and ensuring every visit of ANC and other RH and MHC services delivers comprehensive knowledge of HIV/AIDS are supposed to increase exposure to MTCT knowledge.

ACKNOWLEDGEMENT

We are thankful to the DHS Programs, for granting access to all the relevant data sets for this data.

REFERENCES

1. UNAIDS. UNAIDS Data 2022. Geneva; 2022. https://www.unaids.org/en/resources/documents/2023/2022_unaids_data
2. Republika. Kemenkes: Kasus penularan HIV pada 2023 melonjak, didominasi ibu rumah tangga. 2023 May 13; <https://www.kemkes.go.id/id/rilis-kesehatan/kasus-hiv-dan-sifilis-meningkat-penularan-didominasi-ibu-rumah-tangga>
3. Deynu M, Nutor JJ. Determinants of comprehensive knowledge on mother-to-child transmission of HIV and its prevention among childbearing women in Rwanda: insights from the 2020 Rwandan Demographic and Health Survey. BMC Public Health. 2023 Dec 1;23(1). <https://doi.org/10.1186/s12889-022-14925-9>
4. Chotta NAS, Msuya SE, Mgongo M, Hashim TH, Stray-Pedersen A. Mother's Knowledge on HIV, Syphilis, Rubella, and Associated Factors in Northern Tanzania: Implications for MTCT Elimination Strategies. International Journal of Pediatrics (United Kingdom). 2020;2020. <https://doi.org/10.1155/2020/7546954>
5. UNAIDS. Start free, stay free, AIDS free final report on 2020 targets. UNAIDS. Geneva; 2021. <https://www.unaids.org/en/resources/documents/2021/start-free-stay-free-aids-free-final-report-on-2020-targets>
6. Gouvêa ADN, Trajano AJB, Monteiro DLM, Rodrigues NCP, da Costa JT, Cavalcante MB, et al. Vertical transmission of HIV from 2007 to 2018 in a reference university hospital in Rio de Janeiro. Rev Inst Med Trop Sao Paulo. 2020;62:1–10. <https://doi.org/10.1590/s1678-9946202062066>
7. Abteu S, Awoke W, Asrat A. Knowledge of pregnant women on mother-to-child transmission of HIV, its prevention, and associated factors in Assosa town, Northwest Ethiopia. HIV/AIDS-Research and Palliative Care. 2016;8:101–7. <https://doi.org/10.2147/HIV.S100301>
8. Fassinou LC, Songwa Nkeunang D, Delvaux T, Nagot N, Kirakoya-Samadoulougou F. Adherence to option B + antiretroviral therapy and associated factors in pregnant and breastfeeding women in Sub-Saharan Africa: a systematic review and meta-analysis. BMC Public Health. 2024 Dec 1;24(1). <https://doi.org/10.1186/s12889-023-17004-9>
9. United Nations Children's Fund, World Health Organization. Breastfeeding and HIV: Global breastfeeding collective. Unicef; 2019. <https://www.who.int/publications/i/item/WHO-NMH-NHD-19.22>
10. Mondal S, Deb R. Mother to child transmission of HIV. South Asian Anthropologist. 2016;16(2):211–4. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0260941>
11. Fowler MG, Qin M, Fiscus SA, Currier JS, Flynn PM, Chipato T, et al. Benefits and Risks of Antiretroviral Therapy for Perinatal HIV Prevention. New England Journal of Medicine. 2016;375(18):1726–37. <https://doi.org/10.1056/NEJMoa1511691>
12. Mugwaneza P, Lyambabaje A, Umubyeyi A, Humuza J, Tsague L, Mwanyumba F, et al. Impact of maternal ART on mother-to-child transmission (MTCT) of HIV at six weeks postpartum in Rwanda. BMC Public Health. 2018;18(1):1–11. <https://doi.org/10.1186/s12889-018-6154-6>
13. Elsheikh IE, Crutzen R, Adam I, Abdelraheem SI, Van den Borne HW. Increasing Prevention of Mother to Child Transmission (PMTCT) Uptake through Facility-Based Health Promotion: Intervention Development. Behavioral Sciences. 2023 Apr 1;13(4). <https://doi.org/10.3390/bs13040317>

14. Liyeh TM, Cherkose EA, Limenih MA, Yimer TS, Tebeje HD. Knowledge of prevention of mother to child transmission of HIV among women of reproductive age group and associated factors at Mecha district , Northwest Ethiopia. BMC Res Notes. 2020;13(166):1–6. <https://doi.org/10.1186/s13104-020-05005-5>
15. Mukhtar M, Quansar R, Bhat SN, Khan SMS. Knowledge, attitude and practice regarding mother-to-child transmission of HIV, its prevention, and associated factors among antenatal women attending a health care facility in district Srinagar, North India: a cross sectional study. J Community Med Public Health. 2020;7(7):2622–7. <https://doi.org/10.18203/2394-6040.ijcmph20202987>
16. Siregar KN, Hanifah L, Rikawarastuti R, Wahyuniar L. Prevention of HIV transmission from mother to child: Challenges to the successful program implementation and practice in Indonesia. J Int Assoc Provid AIDS Care. 2021;20:1–7. <https://doi.org/10.1177/23259582211040701>
17. Madiba S, Ralebona E, Lowane M. Perceived stigma as a contextual barrier to early uptake of HIV testing, treatment initiation, and disclosure; the case of patients admitted with AIDS-related illness in a rural hospital in South Africa. Healthcare (Switzerland). 2021 Aug 1;9(8). <https://doi.org/10.3390/healthcare9080962>
18. Ramoshaba R, Sithole SL. Knowledge and awareness of MTCT and PMTCT post-natal follow-up services among HIV infected mothers in the Mankweng Region, South Africa. Open AIDS J. 2017;11:36–44. <https://doi.org/10.2174/1874613601711010036>
19. Teshale AB, Tessema ZT, Alem AZ, Yeshaw Y, Liyew AM, Alamneh TS, et al. Knowledge about mother to child transmission of HIV/ AIDS, its prevention and associated factors among reproductive-age women in sub-Saharan Africa: Evidence from 33 countries recent Demographic and Health Surveys. PLoS One. 2021;16(6):1–12. <https://doi.org/10.1371/journal.pone.0253164>
20. Masaka A, Dikeleko P, Moleta K, David M, Kaisara T, Rampheletswe F, et al. Determinants of comprehensive knowledge of mother to child transmission (MTCT) of HIV and its prevention among Zimbabwean women: Analysis of 2015 Zimbabwe Demographic and Health Survey. Alexandria Journal of Medicine. 2019;55(1):68–75. <https://doi.org/10.1080/20905068.2019.1667114>
21. Gebre MN, Feyasa MB, Dadi TK. Levels of mother-to-child HIV transmission knowledge and associated factors among reproductive-age women in Ethiopia: Analysis of 2016 Ethiopian Demographic and Health Survey Data. Vol. 16, PLoS ONE. Public Library of Science; 2021. <https://doi.org/10.1371/journal.pone.0256419>
22. Eshetu HB, Kebede N, Bogale EK, Zewdie A, Kassie TD, Anagaw TF, et al. Knowledge of prevention of mother-to-child transmission of HIV among reproductive age women in high HIV/AIDS prevalent countries: A multilevel analysis of recent Demographic and Health Surveys. PLoS One. 2023 Oct 1;18(10 October). <https://doi.org/10.1371/journal.pone.0292885>
23. Zegeye B, Ahinkorah BO, Ameyaw EK, Seidu AA, Olorunsaiye CZ, Yaya S. Women's decision-making power and knowledge of prevention of mother to child transmission of HIV in sub-Saharan Africa. BMC Womens Health. 2022;22(115):1–10. <https://doi.org/10.1186/s12905-022-01691-4>
24. Anugwom E, Anugwom K. Socio-cultural factors in the access of women to HIV/AIDS prevention and treatment services in South-southern Nigeria. Iran J Public Health. 2016;45(6):754–60. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5026830/>
25. Croft TN, Marshall AMJ, Allen CK. Guide to DHS Statistics. Guide to DHS Statistics. Maryland, USA: ICF; 2018. p. 1–90. https://www.dhsprogram.com/pubs/pdf/DHSG1/Guide_to_DHS_Statistics_DHS-7.pdf
26. Luba TR, Feng Z, Gebremedhin SA, Erena AN, Nasser AMA, Bishwajit G, et al. Knowledge about mother-to-child transmission of HIV, its prevention and associated factors among Ethiopian women. J Glob Health. 2017;7(2):1–9. <https://doi.org/10.7189/jogh.07.020414>
27. Jahangiry L, Aliyari Z, Ponnet K. A study on the knowledge, attitudes, and behaviors of pregnant women regarding hiv and routine rapid testing: An assessment in a high-risk marginal area. Healthcare (Switzerland). 2021 Jul 1;9(7). <https://doi.org/10.3390/healthcare9070793>

28. Lucien G, Baraka SW, Daudet M, Tshiswaka I, Conserve DF. Socio-structural factors influencing the prevention of mother-to-child transmission of HIV in the Democratic Republic of the Congo: A systematic review. *Matern Child Health J.* 2019;23(7):880–9. <https://doi.org/10.1007/s10995-018-2688-6>
29. Worku MG, Tesema GA, Teshale AB. Prevalence and associated factors of adolescent fatherhood in Ethiopia: a multilevel analysis using the 2016 Ethiopian demographic health survey data. *PLoS One.* 2021;16(3 March):1–11. <https://doi.org/10.1371/journal.pone.0249024>
30. Kurniati A, Chen CM, Efendi F, Berliana SM. Factors influencing Indonesian women's use of maternal health care services. *Health Care Women Int.* 2018;39(1):3–18. <https://doi.org/10.1080/07399332.2017.1393077>
31. Liyeh MT. Determinant factor of married women's knowledge on vertical transmission of HIV in Mecha district, Ethiopia; a community based study. *PLoS One.* 2020;15(12):1–10. <https://doi.org/10.1371/journal.pone.0242659>
32. Darteh EKM, Abraham SA, Seidu AA, Chattu VK, Yaya S. Knowledge and determinants of women's knowledge on vertical transmission of HIV and AIDS in South Africa. *AIDS Res Ther.* 2021;18(40):1–9. <https://doi.org/10.1186/s12981-021-00367-7>
33. Dhillon S, Amoak D, Sano Y, Antabe R, Luginaah I. The association between mother-to-child HIV transmission knowledge and antenatal care utilisation in Cameroon. *International Journal of Health Planning and Management.* 2023 Nov 1;38(6):1877–88. <https://doi.org/10.1002/hpm.3700>
34. Mugweni E, Omar M, Pearson S. Understanding barriers to safer sex practice in Zimbabwean marriages: Implications for future HIV prevention interventions. *Health Educ Res.* 2015;30(3):388–99. <https://doi.org/10.1093/her/cyu073>
35. Hanmer L, Klugman J. Exploring women's agency and empowerment in developing countries: Where do we stand? *Fem Econ.* 2016;22(1):237–63. <https://doi.org/10.1080/13545701.2015.1091087>

Declarations

- Author contribution : DNF and SK were responsible for constructing the study concept and design. DNF conducted the data analysis and drafted the manuscript. SK provided additional analysis and discussion. Both authors approved the final manuscript.
- Funding statement : This research did not receive any funding.
- Conflict of interest : Both authors declare that they have no competing interests.
- Additional information : No additional information is available for this paper.