Health Dynamics
eISSN: 3006-5518
Publisher: Knowledge Dynamics
DOI: https://doi.org/10.33846/hd10801

Original Research

The Influence of HIV/AIDS Literacy in Pregnant Women on Willingness to Undergo PMTCT Examination in Pematangsiantar City, North Sumatra, Indonesia

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Article history
Received: 25 June 2024
Revised: 30 July 2024
Accepted: 31 July 2024
Published Online: 17 August 2024

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How to cite this article: Safrina, Sirait SH, Handayani TE, Ngestiningrum AH. The Influence of HIV/AIDS Literacy in Pregnant Women on Willingness to Undergo PMTCT Examination in Pematangsiantar City, North Sumatra, Indonesia. Health Dynamics, 2024, 1(8), 265-272. https://doi.org/10.33846/hd10801

ABSTRACT

Background: In 2019, 2,370,473 pregnant women in Indonesia were tested for HIV, with 6,439 (0.27%) testing positive. Despite the importance of HIV testing during pregnancy to prevent mother-to-child transmission of HIV (PMTCT), not all pregnant women are willing to undergo testing. This study aims to evaluate the impact of health literacy about HIV/AIDS on pregnant women's willingness to participate in PMTCT examinations in Pematangsiantar City. **Methods:** A quasi-experimental design with pretest and posttest, including a control group, was employed. The study population comprised pregnant women in Pematangsiantar City who had not undergone voluntary counseling and testing (VCT). A total of 102 participants (51 in the experimental group and 51 in the control group) were selected based on specific inclusion and exclusion criteria through consecutive sampling. Health literacy was measured using the Indonesian version of the health literacy questionnaire (HLS-EU-SQ10-IND). Data were analyzed using the McNemar test with a significance level set at $p < 0.05$. **Results:** In the HIV/AIDS literacy group, 32 participants (62.7%) were willing to undergo PMTCT, whereas in the control group, 32 participants (62.7%) were not willing. The literacy group showed significant improvements in willingness to undergo PMTCT after receiving information, with p-values of 0.012 (overall), 0.003 (understanding), 0.021 (assessing), and 0.007 (implementing). Conversely, the control group did not show significant changes, with p-values of 0.375, 0.210, 0.063, and 0.227, respectively. **Conclusion:** Health literacy about HIV/AIDS significantly enhances pregnant women's willingness to participate in PMTCT. Increased counseling and information from health workers are crucial for improving PMTCT coverage.

Keywords: Literacy; pregnant women; HIV; AIDS; PMTCT

1. INTRODUCTION

HIV/AIDS, in various parts of the world, including Indonesia, is considered one of the most contagious diseases. Despite ongoing efforts, HIV/AIDS remains unresolved and continues to be a global issue.(1) HIV can be transmitted vertically from HIV-positive mothers to their babies during pregnancy, childbirth, and breastfeeding, a critical concern

due to its impact on human resources.[2] HIV/AIDS continues to spread rapidly worldwide. The WHO reported that approximately 70 million people globally have been infected with HIV, with around 35 million deaths attributed to the virus. By the end of 2016, approximately 36.7 million (30.8–42.9 million) people were living with HIV, with an estimated prevalence rate of 0.8% (0.7–0.9%) among adults aged 15-49 years.[3]

The government has started targeting housewives, including pregnant women, for HIV protection due to the increasing risk of HIV transmission in low-risk groups, such as mothers and babies. This focus aligns with the SDGs, particularly Goal 3, which emphasizes maternal and child health as a key factor in achieving SDG success, including HIV control through serological diagnostic tests.[4] The increasing number of HIV cases among housewives (14.8%) poses a significant risk, as these women, if pregnant, have the potential to transmit HIV to their babies.[5]

Among the ten provinces with the highest number of HIV cases reported from October to December 2019, North Sumatra ranked sixth, following East Java, West Java, DKI Jakarta, Central Java, and Papua, with a total of 631 cases. The trend shows that HIV infections predominantly affect the productive age group (25-49 years), with an increase from 69.6% in 2018 to 70.4% in 2019. HIV transmission from mother to child is still evident, as indicated by the discovery of HIV and AIDS cases in children under 4 years of age (1%).[6]

In 2019, 2,370,473 pregnant women in Indonesia underwent HIV testing, with 6,439 (0.27%) testing positive. HIV testing during pregnancy is crucial for preventing mother-to-child transmission. HIV infection in infants can lead to significant health issues, including pain, disability, and death, impacting the child's survival and quality of life.[7]

The Prevention of Mother-to-Child HIV Transmission (PMTCT) program in Indonesia aims to prevent the transmission of HIV from mother to baby and reduce the impact of the HIV epidemic on mothers and babies. HIV counseling and testing are essential for preventing transmission if a mother is HIV-positive, in line with WHO recommendations that all pregnant women should be offered HIV testing. This testing allows for timely therapy, safe delivery preparation, and prophylaxis for the baby to avoid HIV infection. Additionally, the Indonesian Minister of Health Regulation No. 52 of 2017 mandates that every pregnant woman undergo an examination/test, known as "triple elimination," to prevent the transmission of HIV, syphilis, and hepatitis B. These infections share similar transmission patterns: sexual intercourse, blood contamination, and vertical transmission from mother to child.[4] Research by Simangunsong et al. (2020) indicated that many pregnant women still refuse HIV screening due to a lack of information about HIV/AIDS and the risk of transmission. Stigma and misconceptions about HIV/AIDS contribute to this issue.[8]

Health literacy is a key intervention for improving understanding of health information.[9,10] It involves the ability to communicate and understand health information effectively, which is crucial for disease prevention, early detection, and informed decision-making.[10,11] Thompson et al. (2015) emphasized that health literacy is especially important for people living with HIV/AIDS, positively affecting behavior and health outcomes.[12] Sari (2013) highlighted that good health literacy enables individuals to gain knowledge, access and evaluate information, understand transmission, prevention, and use health services effectively.[13] The low health literacy in Garut was attributed to difficulties in assessing and applying health information.

Lack of adequate knowledge about HIV and PMTCT practices may contribute to mother-to-fetus transmission of HIV. In the absence of an effective vaccine or cure, voluntary counseling and testing are vital for prevention. Health education and awareness campaigns targeting women during prenatal visits can improve acceptance and accessibility of PMTCT services.[14] A preliminary survey of 25 pregnant women in Pematangsiantar revealed that 20 women in their third trimester had not undergone PMTCT examination during their Ante Natal Care (ANC) visits at the Midwife Clinic Practice, citing a lack of information. Additionally, data from a health center in Pematangsiantar City reported 6 HIV cases in 2020. This study aims to evaluate the impact of health literacy about HIV/AIDS on pregnant women's willingness to participate in PMTCT examinations in Pematangsiantar City, aligning with the second mission of the Pematangsiantar Midwifery Study Program to prevent HIV/AIDS and sexually transmitted infections, particularly in mothers and children.

2. METHODS

2.1 Study Design and Setting

This study is a quasi-experimental design with pretest and posttest measures, including a control group. It was conducted in Pematangsiantar City in 2021. The population consisted of all pregnant women who had not undergone voluntary counseling and testing (VCT) at the Pematangsiantar City Midwife Clinic. The sample size was determined using a formula for two independent populations.[15] A total of 102 respondents (51 in the experimental group and 51 in the control group) were selected based on inclusion criteria using consecutive sampling techniques.

Inclusion criteria: Normal pregnant women at any gestational age, able to read and write in Indonesian, with no history of serious illness based on anamnesis and medical records, willing to participate, and residing in Pematangsiantar City. Exclusion criteria: Respondents who did not participate in the entire series of research activities.

This research received ethical approval from the KEPK with Approval Letter No. 01.0150/KEPK Poltekkes Kemenkes Medan.

2.2 Instrument

The research instrument used was the Indonesian version of the health literacy measurement questionnaire, specifically the Health Literacy Study-European-Short Question-10 Indonesia (HLS-EU-SQ10-IND). The questionnaire was adapted to measure health literacy related to HIV/AIDS and was tested for validity and reliability before being administered to the respondents.

2.3 Data Collection and Resources

Primary data were collected for this study. Respondents first completed a pretest. The intervention group then received literacy training about HIV/AIDS, delivered via audio-visual videos accessible at the following link: HIV/AIDS Literacy Videos. All respondents in the intervention group watched the video for 2 consecutive days and signed an attendance list. On the third day, they completed the HIV/AIDS health literacy posttest questionnaire. The control group, after completing the pretest, received standard care according to the existing procedures at the service location and completed the posttest on the third day.

2.4 Data Analysis

Data analysis was conducted in two stages. Univariate analysis was used to describe the characteristics of each variable by calculating frequency distributions and percentages for each group. Bivariate analysis was performed to identify relationships between two variables: the independent variable (HIV/AIDS literacy) and the dependent variable (willingness to undergo PMTCT examinations). The chi-square statistical test (χ^2) was used to assess these relationships, with a significance level set at $p < 0.05$. The McNemar test was used to evaluate the effect of HIV/AIDS literacy on the willingness to undergo PMTCT examinations between the paired groups before and after the intervention, with a significance level set at $p < 0.05$.

3. RESULTS

3.1 Overview of Respondent Characteristics

Table 1 presents the frequency distribution of respondent characteristics in both groups—the literacy group and the control group. The description of each respondent characteristic is as in Table 1.

Based on Table 1, the age distribution of respondents in both groups is similar, with the highest percentage (98%) in the 20-35 year age range in the control group. Ethnicity distribution shows that both groups have the highest percentage of Javanese respondents, with the HIV/AIDS literacy group having the highest proportion (78.4%). Regarding education, the highest level of education for both groups is high school, with the control group showing the highest percentage (94.1%). Occupation data indicate that the most common occupation in both groups is housewife, with the highest percentage in the HIV/AIDS literacy group (98%). The primary source of information about HIV/AIDS for the HIV/AIDS literacy group is health workers (58.8%), while for the control group, it is television (60.8%). For information about PMTCT, both groups rely most on health workers, with the HIV literacy group having the highest percentage (62.7%). The willingness to undergo PMTCT was higher in the HIV/AIDS literacy group, with 32 pregnant women (62.7%) willing, compared to the control group where 32 pregnant women (62.7%) were unwilling.

Table 1. Characteristics of Respondents in the Two Groups in Pematangsiantar City, 2021

Variable	HIV literacy group		Control group	
	n	%	n	%
1. Age				
< 20 years	1	2.0	0	0
20-35 years	46	90.2	50	98.0
> 35 years	4	7.8	1	2.0
Total	51	100	51	100
2. Ethnic group				
Javanese	40	78.4	36	70.6
Batak	10	19.6	15	29.4
Nias	1	2.0	0	0
Total	51	100	51	100
3. Education				
Elementary school	1	2.0	0	0
Junior high school	16	31.4	2	3.9
High school	32	62.7	48	94.1
College	2	3.9	1	2.0
Total	51	100	51	100
4. Occupation				
Teacher	0	0	1	2.0
Tailor	1	2.0	1	2.0
Selfemployed	0	0	1	2.0
Housewife	50	98.0	48	94.1
Total	51	100	51	100
5. HIV/AIDS information source				
Health workers	30	58.8	15	29.4
TV	14	27.5	31	60.8
Newspapers/magazines	0	0	0	0
Social media friends	7	13.7	5	9.8
Total	51	100	51	100
6. PMTCT information source				
Health Workers	32	62.7	29	56.9
TV	10	19.6	15	29.4
Newspapers/magazines	0	0	4	7.8
Social media friends	9	17.6	3	5.9
Total	51	100	51	100
7. PMTCT willingness				
Yes	32	62.7	19	37.3
No	19	37.3	32	62.7
Total	51	100	51	100

According to Table 2, the highest percentage of pregnancies in the HIV/AIDS literacy group is ≥ 3 pregnancies (45.1%), whereas the highest percentage in the control group is the second pregnancy (41.2%). ANC examination history in the HIV/AIDS literacy group is most commonly 3 times and ≥ 4 times (27.5%), while in the control group, the highest percentage is for 2 ANC visits (52.9%). The highest percentage of gestational age in both groups is in the 2nd trimester, with the highest percentage in the control group (58.8%).

Table 2. Distribution of Respondents in Both Groups Based on ANC History in Pematangsiantar City, 2021

Variable	HIV literacy group		Control group	
	n	%	n	%
Pregnancy				
First	13	25.5	20	39.2
Second	15	29.4	21	41.2
Third and above	23	45.1	10	19.6
Total	51	100	51	100
ANC history				
First	12	23.5	7	13.7
Second	11	21.6	27	52.9
Third or above	14	27.5	11	21.6
Fourth or above	14	27.5	6	11.8
Total	51	100	51	100
Gestational age				
First	9	17.6	3	5.9
Second	25	49.0	30	58.8
Third and above	17	33.3	18	35.3
Total	51	100	51	100

3.2 Relationship Between HIV/AIDS Literacy and PMTCT Willingness

Table 3 presents the relationship between HIV/AIDS literacy and willingness to undergo PMTCT in both groups in Pematangsiantar City in 2021.

3.3 Chi-Square Test

Based on Table 3, there is a significant relationship between willingness to undergo PMTCT in both groups before and after receiving HIV/AIDS information. In the control group, the chi-square test results are significant both before ($p = 0.007$) and after ($p = 0.000$) receiving the information. The relationship between the two groups after applying the information shows significance, with a p value of 0.012 in the literacy group and a p value of 0.004 in the control group.

Table 3. Relationship Between HIV/AIDS Literacy and PMTCT Willingness in Both Groups in Pematangsiantar City, 2021

Variable	PMTCT willingness						*p*-value
	Literacy group (n=51)			Control group (n=51)			
	Yes	No	Total	Yes	No	Total	
Before finding information							
High	21	11	32	6	13	19	0.859
Low	12	7	19	6	26	32	0.296
Total	33	33	51	12	39	51	
Before understanding the information							
High	18	14	32	12	7	19	0.389
Low	13	6	19	8	24	32	0.007
Total	31	20	51	20	31	51	
Before assessing the information							
High	24	8	32	4	15	19	0.611
Low	13	6	19	13	19	32	0.152
Total	37	14	51	17	34	51	
Before applying the information							
High	17	15	32	5	14	19	0.691
Low	9	10	19	7	25	32	0.743
Total	26	25	51	12	39	51	
After finding information							
High	30	2	32	8	11	19	0.179
Low	15	4	19	7	25	32	0.125
Total	45	6	51	15	36	51	
After understanding the information							
High	29	3	32	16	3	19	1.000
Low	17	2	19	10	22	32	0.000
Total	46	5	51	26	25	51	
After assessing the information							
High	31	1	32	4	15	19	0.140
Low	16	3	19	8	24	32	1.000
Total	47	4	51	12	39	51	
After applying the information							
High	29	3	32	11	8	19	0.012
Low	11	8	19	6	26	32	0.004
Total	40	11	51	17	34	51	

3.4 McNemar's Test

According to Table 3.4, the increase in HIV/AIDS literacy information before and after the intervention was greater in the literacy group, with 29 respondents, compared to 11 in the control group. There was a significant effect of HIV/AIDS literacy information before and after the intervention in the literacy group (p = 0.012), whereas no significant effect was found in the control group (p = 0.375).

Understanding of HIV/AIDS literacy information was higher in the literacy group, with 27 respondents, compared to 15 in the control group. There was a significant effect of understanding information before and after the intervention in the literacy group (p = 0.003), while no significant effect was observed in the control group (p = 0.210).

Assessing HIV/AIDS literacy information before and after the intervention was higher in the literacy group, with 34 respondents, compared to 12 in the control group. There was a significant effect on assessment in the literacy group (p = 0.021), but no significant effect was found in the control group (p = 0.063).

Application of HIV/AIDS literacy information before and after the intervention was also higher in the literacy group, with 21 respondents, compared to 9 in

the control group. There was a significant effect of applying HIV/AIDS information in the literacy group (p = 0.007), while no significant effect was observed in the control group (p = 0.227).

Table 4. Effect of HIV/AIDS Literacy Before and After Intervention Between the Two Groups in Pematangsiantar City, 2021

Variable	Literacy group (n=51)			Control group (n=51)			*p*-value
	High	Low	Total	High	Low	Total	
Before finding information							
High	29	4	33	11	1	12	0.012
Low	16	2	18	4	35	39	0.375
Total	45	6	51	15	36	51	
Before understanding the information							
High	27	4	31	15	5	20	0.003
Low	19	1	20	11	20	31	0.210
Total	46	5	51	26	25	51	
Before assessing the information							
High	34	3	37	12	5	17	0.021
Low	13	1	14	0	34	34	0.063
Total	47	4	51	12	39	51	
After applying the information							
High	21	5	26	9	3	12	0.007
Low	19	6	25	8	31	39	0.227
Total	40	11	51	17	34	51	

4. DISCUSSION

The results of the study indicate that both groups shared several key characteristics: most respondents were aged 20-30 years, were of Javanese ethnicity, had completed high school, were housewives, were in their second trimester of pregnancy, and obtained most of their PMTCT information from health workers. However, sources of information about HIV/AIDS differed between the groups. In the literacy group, information was predominantly obtained from health workers (58.8%), whereas in the control group, the majority of information was sourced from TV (60.8%).

The ANC examination history showed that the literacy group had a higher percentage of respondents with three or more ANC visits (27.5%). Additionally, pregnancies exceeding three were more common in the literacy group, while the control group had a higher percentage of first and second pregnancies. The willingness to undergo PMTCT examination was notably higher in the literacy group, with 32 respondents (62.7%) willing, compared to only 19 respondents (37.3%) in the control group. Some reasons for not taking an HIV test included lack of awareness of the examination, fear, disbelief about contracting HIV, and apprehension about test results.

The dominant factor related to the willingness to take an HIV test is knowledge. Having a good understanding of HIV, the benefits of testing, and the dangers and prevention of mother-to-child transmission positively impacts health outcomes and improves the PMTCT program.[16]

The study results indicate a relationship between the willingness to undertake PMTCT both before and after understanding HIV/AIDS information in the control group, with chi-square test results showing p values of 0.007 before and 0.000 after. This suggests that the control group's increased understanding of HIV/AIDS information could be attributed to their exposure to information from TV (60.8%). This finding is consistent with Wenny et al. (2016),[17] who reported that over 70% of HIV information respondents received came from TV. Limited information about HIV testing provided by health workers may have contributed to a lack of awareness about the test, with only a few health workers explaining its function and benefits (32.94%). Respondents' knowledge varied depending on whether they were informed about the HIV test.

Access to health information has evolved, allowing individuals to increase their health literacy through various sources such as mass media, the

internet, print media, brochures, posters, discussion forums, and counseling. Effective health literacy involves accessing, understanding, and applying health-related information to make informed decisions about one's health.[11] In this study, health literacy interventions, such as providing videos and pocket books about HIV/AIDS via WhatsApp group links, had a positive impact on the willingness of pregnant women to undergo PMTCT examinations.

Understanding the importance of early disease detection through PMTCT is crucial, even amidst challenges like the COVID-19 pandemic. The health literacy concept model by Sorensen et al. (2013) highlights competencies related to accessing, understanding, assessing, and applying health-related information.[18]

Health information literacy interventions are vital for increasing public awareness and enabling individuals to make informed decisions about their health. Despite the success of the TKIP program in encouraging HIV testing among pregnant women, there is still a need for improved counseling and information about HIV and HIV testing from health workers. Enhanced support from relevant agencies will be essential for optimizing this program.[17]

5. CONCLUSION

This study highlights the impact of HIV/AIDS literacy interventions on information sources, PMTCT willingness, and literacy outcomes. Health workers were the primary source of HIV/AIDS information for the literacy group (58.8%), while TV was the predominant source for the control group (60.8%). Both groups relied on health workers for PMTCT information; however, the literacy group demonstrated a higher willingness to undergo PMTCT (62.7%) compared to the control group, where 62.7% were unwilling. The HIV/AIDS literacy group showed significant improvements in literacy knowledge, understanding, and application before and after the intervention, with p-values of 0.012, 0.003, and 0.007, respectively. In contrast, the control group exhibited no significant changes in these areas (*p*-values of 0.375, 0.210, and 0.227). These findings suggest that targeted HIV/AIDS literacy programs effectively enhance knowledge and increase PMTCT willingness. We recommend expanding health worker-led counseling and providing accessible, clear information to improve health literacy and PMTCT coverage.

Acknowledgement

We thanks to Poltekkes Kemenkes Medan and Poltekkes Kemenkes Surabaya for the research support.

Funding Information

This research received research funding from the Poltekkes Kemenkes Medan.

Conflict of Interest

The authors declare no conflict of interest.

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