

HIV INFECTION TRANSMISSION FROM MOTHER POSITIVE HIV TO BABY WHICH BORN AT GENERAL HOSPITAL ADAM MALIK MEDAN FROM 2009 – 2017

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Abstract : This study is supposed to determine the characteristics and factors that influence the transmission of HIV infection in infants of HIV-positive mothers born in Medan Haji Adam Malik Hospital from 2009-2017. This study was a descriptive study with a cross sectional approach, to assess the proportion of transmission and relationships between infants of mothers with positive HIV who were born in Haji Adam Malik General Hospital, Medan. The research sample was part of the study population that met the inclusion and exclusion criteria using the total sampling method. All data collected is then analyzed. Data were analyzed using bivariate analysis using chi square if the data were normally distributed and fisher exact tests if the data were not normally distributed. A p value of less than 0.05 was considered significant with 95% CI. Based on the research it was found that there was an increase in the prevalence of transmission of HIV infection from mother to baby by 70.8 times in mothers taking ARV <6 months compared to mothers taking ARV \geq 6 months, and there was an increase in transmission of HIV infection from mother to baby 25.5 times in patients with CD4 levels <350 compared with patients who have CD4 levels > 350. And found an increase in transmission of HIV infection from mother to baby by 1.96 times in patients with PROM compared with patients who did not experience PROM and found an increase the incidence of transmission of HIV infection from mother to baby is 15.4 times in patients giving birth with SVD compared to patients who give birth with CS. There is a correlation between transmission of HIV infection from mother to baby with risk factors for PROM, consumption of ARV <6 months, CD4 level <350 and methods of vaginal delivery

IndexTerms: transmission, HIV, MTCT, HIV transmission from mother to child.

I. INTRODUCTION

Since its discovery in the United States in 1981, the number of people with HIV / Human Immunodeficiency Virus and AIDS / Aquired Immunodeficiency Syndrome until 2018 continues to grow and develops into a major global health issue.¹ In 2016, as many as one million people died from HIV, around 36.7 million people are HIV sufferers, and the total number of new cases of HIV reaches 1.8 million people. Based on activities carried out by the North Sumatra Provincial Health Office, in 2016 there was 26,343 pregnant women who took an HIV test and received results of 187 HIV positive people.² In 2017, out of 34,486 pregnant women who took an HIV test, 33 HIV positive people.³ In Medan city on 2014 there were 33 HIV positive pregnant women receiving PMTCT services (Preventing Transmission of Mother to Child Infection). More than 90 percent of all HIV cases in newborns are the result of perinatal HIV transmission, which can occur during pregnancy (in utero), during delivery (intrapartum), or after delivery (post-birth) through breastfeeding. The National HIV Strategy in 2015 - 2019 emphasizes that prevention of HIV transmission from mother to baby is a priority program, so that transmission of HIV from mother to baby can be prevented.⁴ Often patients who come to the General Hospital Haji Adam Malik Medan are in labor before the date of cesarean section which has been determined, so that labor must be carried out with emergency cesarean section. This increases vertical transmission from mother to baby. Babies born from HIV positive mothers didn't get complete treatment, only about 30% of these babies who come regularly until the age of 18 months and receive ARV therapy. Therefore, the writer raises this problem to find out when the highest transmission of HIV infection from mother to baby in Haji Adam Malik General Hospital Medan.

II. RESEARCH METHODOLOGY

This research is a descriptive study with Cross Sectional approach, to assess the proportion of transmission and relationship between infants of HIV positive mothers born at General Hospital Haji Adam Malik Medan. The research sample is part of the study population that meets the inclusion and exclusion criteria. Inclusion criteria included all mothers with HIV infection who were helped to give birth at the General Hospital Haji Adam Malik Medan, either vaginal delivery or cesarean section. All infants of HIV positive mothers born at General Hospital Haji Adam Malik Medan with exclusion criteria for incomplete medical record data. The sample size in this study was taken with proportion formula of pregnant women with HIV infection who gave birth at General Hospital H Adam Malik Medan population of. Sampling is done by consecutive sampling method, so that the sample in this study is equal to the total population. After obtaining approval from the ethics commission to conduct research, the study began by collecting research subjects according to inclusion and exclusion criteria. The results of this study are presented in the frequency distribution table. To assess the frequency distribution of the characteristics of the study sample. To assess the description of infant outcomes found in women with HIV AIDS with and without ARVs, a Bivariate statistical analysis was performed using the Chi Square Test when the chi square requirements were met and the Fisher exact test if the requirements were not met. P value <0.05 with 95% CI was considered statistically significant.

Work Arrangement

After obtaining approval from the ethics commission to conduct research, the study began by collecting research subjects according to inclusion and exclusion criteria. In this study the data collection technique used secondary data, namely data obtained from medical records of HIV positive patients who have labor at General Hospital Haji Adam Malik Medan from 2009 - 2017 and also looked at the medical records of babies born by these mothers to see the outcomes which baby birth weight data, APGAR score and HIV infection status in infants.

Statistical Analysis

The results of this study are presented in the frequency distribution table. To assess the frequency distribution of the characteristics of the study sample. To assess the description of infant outcomes found in mother with HIV AIDS with and without ARVs, a bivariate statistical analysis was performed using the Chi Square Test when the chi square requirements were met and the Fisher exact test if the requirements were not met. P value <0.05 with 95% CI was considered statistically significant.

III. RESULTS AND DISCUSSION

From this study, it was found that the majority of HIV patients who came to General Hospital Adam Malik which less than 30 years of age as many as 90 (62.5%) people, while the remaining 54 (37.5%) people were over 30 years of age. Based on education and marital status, the majority was high school patients with 89 (61.8%) people and married once with 125 (86.8%) people. The majority gestational age of patients who came to General Hospital H Adam Malik was > 37 weeks as many as 127 (88.2%) cases.

Table 1. Characteristics of Research Subjects

Characteristics	N	%
Age		
< 30 years old	90	62,5
> 30 years old	54	37,5
Education		
Junior High School	55	38,2
Senior High School	89	61,8
Parity		
Primipara	35	24,3
Secundipara	57	39,5
Multipara	54	37,5
Marital Status		
Once	125	86,8
Twice	19	13,2
Gestational Age		
< 37 weeks	17	11,8
≥ 37 weeks	127	88,2
Total	144	100

From the results of the study we can see the majority of HIV patients who came to General Hospital H Adam Malik, the majority had less than 30 years of age with 90 (62.5%) people, while the remaining 54 (37.5%) were over 30 years of age. Based on education and marital status, the majority was high school patients with 89 (61.8%) people and married once with 125 (86.8%) people. The majority gestational age of patients who came to General Hospital H Adam Malik was > 37 weeks as many as 127 (88.2%) cases, with the length using ARV > 6 months found as many as 89 (61.8%) cases; ≤ 6 months were 38 (26.4%) cases and did not take medication as many as 17 (11.8%) cases. The majority of patients' CD4 levels were > 350 in 127 (88.2%) cases. The majority of the study sample did not experience KPD as many as 135 (93.8%) cases while as many as 4 (2.8%) cases experienced KPD less than 4 hours and as many as 5 (3.5%) cases experienced KPD more than 4 hours. The majority of delivery methods in this study were 132 cesarean section (91.7%) cases and 12 cases (8.3%) with vaginal birth. All newborns from the sample received breastfeeding substitute in 144 (100%) cases. HIV testing in the majority of infants used rapid tests which 56 (38.9%) cases with negative results, while positive results were found in 4 (2.8%) cases. Based on PCR examination, the number of negative cases was found in 48 (33.3%) cases and positive PCR were 12 (8.3%) cases. All babies were born alive in 144 (100%) cases and infants infected with HIV in 104 (72.9%) cases, infected in 16 (11.1%) cases and loss follow-up in 24 (16%) cases.

Based on the health profile of North Sumatra Province in 2019, it is known that based on age group, 84% of cases infected with HIV are in the age group of 20-39 years. Based on research conducted by Zahroh⁶¹ 2015, at Purwodadi, Danyang and Kuripan villages, they found that the majority education levels of HIV sufferers were in primary school with 139 (46%) cases and junior high / junior high schools in 103 (34.3%) cases. Based on research conducted by Putri Ulina in 2017 at the Sanglah Central General Hospital in Denpasar, it was found that the majority of patients who came for treatment which aged 30-39 years were 71 (39.7%) cases with marital status as many as 132 (73.7%) cases and haven't married as many as 41 (22.9%) cases. The results of this study are in accordance with research conducted by Sitepu in 2014 which stated that Jember Regency's HIV / AIDS cases were dominated by those have productive age and active sexual age at the age of 20-49 years. Productive and sexually active age can transmit HIV / AIDS more easily through sexual relations.⁶ The results of this study are also in line with Darmayasa's 2013 research in Sitepu study that there is a relationship between maternal age and HIV infection in Bali. More specifically, it's meant HIV infection of housewives in Bali mostly occurs at under 31 years old. This is related to biological vulnerability and sexually transmitted infections that have occurred before and are not treated. Also, these young women have a tendency to have sex at a younger age and have sex with older men, where most of the men are likely to engage in risky sexual activity beforehand.⁶

There are four natural phases of HIV infection in housewives when they are pregnant, namely: the primary phase (up to 10 weeks after incubation of the disease), the initial phase of the disease (10 weeks to 5 years), the intermediate phase (5 years to 10 years), and the final phase (more than 10 years). Therefore, seeing the natural journey phase, housewives infected with HIV come in the intermediate phase. If the risky sexual intercourse carried out at early 20 years old or late teens, then the housewife only examined herself 10 years later. Checking themselves is caused by the appearance of clinical symptoms in this intermediate phase, such as: fever, weight loss, skin complaints, minor infections, and TB infections (tuberculosis). Because in the initial phase of the disease is usually asymptomatic so that when screening for HIV infection, pregnant women with HIV infection will be obtained in the age range of 30-40 years. The initial entry of HIV into the body actually has begun 5-10 years earlier⁷. Pratiwi, et al. who get data that HIV infection in mothers is higher in women who have completed secondary education.⁸ Wand et al. in their writings also mention that there is no relationship between higher education and knowledge of existing HIV infection with a reduced risk for HIV infection in mothers. It is precisely in the study carried out by Wand, et al., It was found that sexually transmitted infections, including HIV infections in them, were more prevalent in groups with high school education status.⁶

Table 2. The Relationship between the Use of ARVs in Pregnant Women and the HIV Infection Transmission in Infants from HIV Positive Mothers.

ARV < 6 months	HIV				Total		PR	P
	negative		positive		n	%		
	n	%	n	%				
No	98	81.7	3	2.5	101	84.2	70,8	0.001
Yes	6	5	13	10.8	19	15.8		
Total	104	86.7	16	13.3	120	100		

*Chi square test

Based on table 2, its showed that on ARV use <6 months, it was found HIV cases were positive in 13 (10.8%) cases while HIV negative cases were found in 6 (5%) cases. At the use of ARV ≥ 6 months, HIV negative cases were found in 3 (2.5%) cases and HIV positive cases were 98 (81.7%) cases. Based on statistical analysis, it was found that the value of P = 0.001 showed the use of ARV <6 months has a significant relationship with the incidence of HIV infection transmission from mother to baby. From the analysis, it was found the PR value was 70.8. This shows that the use of ARV ≥6 months increases the rate of HIV transmission from mothers to babies.

Based on the Goga study in 2016, national data from 10106 and 9120 participants were analyzed (survey 2011-12 and 2012-13). HIV exposure in infants was 32.2% (95% confidence interval (CI) 30.7-33.6%), in 2011-12 and 33.1% (95% CI 31.8-34.4%), the range of provinces 22.1-43.6% in 2012-13. The rate of HIV transmission from mother to baby is 2.7% (95% CI 2.1% -3.2%) in 2011-12 and 2.6% (95% CI 2.0-3.2%), range cases in the provinces were 1.9-5.4% in 2012-13. HIV-infected women who received ARVs had a lower HIV transmission (2.0% [2011-12: 1.6-2.5%; 2012-13: 1.5-2.6%]) compared to mothers who didn't receive ARVs [10.2% in 2011-12 (6.5-13.8%); 9.2% in 2012-13 (5.6-12.7%)]. The pooled analysis showed a significantly lower initial HIV transmission among exclusive breastfeeding mothers who received ARV prophylaxis > 10 weeks compared with those not receiving ARVs: (2.2% [95% CI 1.25-3.09%] vs 12.2% [95% CI 4.7 - 19.6%].); among HIV-infected women who received ARVs 24.9% (95% CI 23.5-26.3%) and started receiving ARVs during or before the first trimester, the incidence of HIV transmission was 1.2% (95% CI 0.6-1.7%).⁹

Table 3. The Relationship of CD4 Levels of Pregnant Women and HIV Infection Transmission in Infants of HIV Positive Mothers

CD4 < 350	HIV				Total	PR	P	
	negative		positive					
	n	%	n	%				
No	102	85	2	1.7	104	86.7	25,2	0.001
Yes	2	1.7	14	11.7	16	13.3		
Total	104	86.7	16	13.3	120	100		

*Chi square test

Table 3 shows that with CD4 level <350, HIV positive cases were found in 14 (11.7%) cases and only 2 (1.7) cases were HIV negative. At a CD4 level ≥ 350, it was found that HIV positive cases were found in 2 (1.7) cases while HIV negative cases were found in 102 (85%) cases. From the statistical test it was found that p value = 0.001 that shows there is a statistically significant relationship between CD4 levels and the incidence of HIV infection transmission from mother to baby. From the analysis it was found that the PR value was 25.2 which showed that CD4 count <350 increased the incidence of HIV transmission from mother to baby by 25.2 times.

In the study of Thomas et al., Among the 487 live born, single, or first born infants, the rate of cumulative HIV transmission at birth, 6 weeks, and 6, 12, and 24 months was 2.5%, 4.2%, 5.0%, 5.7%, and 7.0% respectively. Rates of first 24-month HIV transmission grouped according to the mother's CD4 count at baseline <500 and ≥ 500 were 8.4% (95% confidence interval [CI] 5.8% -12.0%) and 4.1% (1, 8% -8.8%), respectively (p = 0.06); whereas based on baseline viral load <10,000 and ≥ 10,000 were 3.0% (1.1% -7.8%) and 8.7% (6.1% -12.3%), respectively (p = 0.01). None of the 12 maternal and 51 infants deaths were associated with ARVs. The rate of HIV transmission or cumulative transmission in the first 24 months was 15.7% (95% CI 12.7% -19.4%).¹⁰

Table 4. Relationship between Premature Rupture of Membrane (PROM) Disease and HIV Infection Transmission in Infants with HIV Positive Mothers.

PROM	HIV				Total	PR	P	
	negative		positive					
	n	%	n	%				
No	104	86.7	11	9.2	115	95.8	1,96	0.001
Yes	0	0	5	4.2	5	4.2		
Total	104	86.7	16	13.3	120	100		

*Chi square test

Based on table 4, it was found that in the PROM case there were 5 HIV positive cases (4.2) while the HIV negative case was not found. In patients who did not experience PROM, 11 (9.2) HIV positive cases

were found while HIV negative cases were found in 104 (86.7) cases. Based on statistical tests, p value was 0.001. This shows that there is a significant relationship between PROM and HIV infection transmission from mother to baby. From the analysis also found the PR value was 1.96. This shows that the incidence of PROM over 4 hours increases HIV transmission from mother to baby by 1.96 times.

Based on Aagard's study, among HIV-positive women, those identified in 291 pregnancies occurred at study intervals from two institutions. Of these pregnancies, 7 (2.4%) cases experienced PPRM far from the age of term with delivery occurring at 25-32 weeks' gestation. Vertical HIV transmission was recorded in 2 of 6 children whose long-term follow-up status was confirmed (33%) of these cases. However, both of these cases occurred in women who did not take antepartum / intrapartum ARV therapy or only received zidovudine monotherapy. Regardless of management during pregnancy, no cases of vertical HIV transmission occurred in women who received multi-therapy or antivirals who were very active at the time of PPRM and who delivered by cesarean delivery in cases where pre-delivery viral load > 1000 copies / mL.¹⁰

Based on Mark's research, in two hundred and ten HIV-positive women with a viral load <1,000. Viral load (VL) was undetectable (<50 viruses / mL) for most women (167, 80%), and <1,000 viruses / mL for all women. The mode of delivery was vaginal delivery in 107 (51%) samples and cesarean section in 103 (49%) samples. The average duration of PROM was 0.63 hours (range 0 to 77.87 hours) for the whole group and 2.56 hours (range 0 to 53.90 hours) in normal childbirth. Among women with undetectable VL, as many as 90 (54%) cases underwent vaginal delivery and 77 (46%) cases had cesarean section surgery. Among the women in this cohort there were no cases of HIV transmission from mother to baby. This study found that there was no relationship between PROM duration or the mode of delivery and transmission of HIV from mother to baby in 210 pregnant women infected with HIV during pregnancy with an undetectable viral load.¹¹

Table 5. The Relationship between the delivery method and HIV Infection Transmission in Infants with HIV Positive Mothers.

Delivery Method	HIV				Total	PR	P
	Negative		Positive				
	n	%	n	%			
cesarean section	99	82.5	9	7.5	108	90	15,4 0.001
Vaginal delivery	5	4.2	7	5.8	12	10	
Total	104	86.7	16	13.3	120	100	

*Chi square test

Table 5. shows that there were 7 (5.8%) cases of HIV-positive cases and 5 (4.2%) HIV-negative cases with vaginal delivery. There were 9 (7.5%) cases of HIV-positive cases with cesarean section delivery while the HIV negative cases were found in 99 (82.5%) cases. Based on statistical analysis, p value was 0.001, which shows that there is a significant relationship between vaginal delivery method with HIV infection transmission from mother to baby. From the analysis also found a PR value was 15.4, this shows that vaginal delivery method increases HIV transmission from mother to baby.

Based on systematic review studies conducted by Kennedy from 2567 identified studies, 36 articles met the inclusion criteria. A single randomized trial, published in 1999, reported minimal maternal morbidity and fewer HIV infections in babies born with elective surgery [odds ratio (OR) 0.2, 95% confidence interval (CI) 0.0-0.5]. Of all observational studies, elective cesarean section was associated with an increase in maternal morbidity compared to vaginal delivery (OR 3.12, 95% CI 2.21-4.41). Elective cesarean section was also associated with a reduction in overall HIV infection in infants (OR 0.43, 95% CI 0.30-0.63) and in low / middle income countries (OR 0.27, 95% CI 0.16-0.45), but not among women on ART (0.82, 95% CI 0.47-1.43) or with a CD 4 count of more than 200 / VL less than 400 / at term of age (OR 0.59, 95% CI 0.21-1.63). Infant morbidity increases with elective cesarean section. Although the planned cesarean section can reduce HIV infection in infants, this effect is not statistically significant in the context of combination ART and low viral load. Because elective cesarean section has other risks, routine elective cesarean section for all women living with HIV may be inappropriate. The risks and benefits will differ depending on the risks underlying the complications of elective cesarean section and vertical transmission during labor. Understanding the risks and benefits of individual clients and respecting women's autonomy remains important.¹²

In this study it was found that all infants born from HIV positive mothers were 16 (13.2%) cases and HIV negative were 105 (86.8%) cases. Based on Kurewa's research, in 1,045 couples with single infants, 474 HIV-positive and 571 HIV-negative mothers gave birth to 469 and 569 live infants, respectively. The difference in mortality was at 6 weeks and 4 months with RR respectively (95% CI) 9.71 (1.22-77.32) and 21.84 (2.93 to 162.98). Overall, the 9-month mortality rate is 150 and 47 per 1,000 person-years for babies born to HIV-positive and HIV-negative mothers respectively. The proportionate risk of death ratio for children born to HIV-positive mothers is 3.21 (1.91 to 5.38) when compared to children born to HIV-negative mothers. Maternal HIV exposure is associated with higher mortality in the first 4 months of life. Infant HIV status is the strongest predictor of infant mortality.¹³

IV. CONCLUSION

Based on the study it was found that there was an increase in the prevalence of HIV infection transmission from mother to baby by 70.8 times in mothers who took ARV <6 months compared to mothers who took ARVs \geq 6 months, and there was an increase in transmission of HIV infection from mothers to infants by 25, 5 times in patients with CD4 levels <350 compared with patients who have CD4 levels > 350. And found an increase in transmission of HIV infection from mother to baby by 1.96 times in patients with PROM compared with patients who did not experience PROM and found an increase in transmission HIV infection events from mother to baby by 15.4 times in patients giving birth with vaginal delivery compared to patients who give birth with cesarean section.

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VI. ETHICAL CLEARANCE

All research data included in this study were obtained from searching medical records at the hospital concerned. Existing data will be recorded by researchers and then processed data. This research was conducted with the approval of the Ethics Committee Faculty of Medicine, University of North Sumatra.

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