Risk Factors, Clinical Stage, and CD4 Counts on HIV-Infected Patients in Pregnancy at Local Government Hospital

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RESEARCH ARTICLE

Risk Factors, Clinical Stage, and CD4 Counts on HIV-Infected Patients in Pregnancy at Local Government Hospital

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ABSTRACT

Perinatal period was the third-highest of HIV/AIDS transmission in Indonesia.

The information related to the prevalence of cases and risk factors of HIV in pregnancy in each area was still restricted. This research aimed to determine the risk factors, clinical stage, and CD4 counts in pregnant women with HIV at local government hospital. This research was carried out from medical records in Ibnu Sina Hospital from January 2013 to June 2020 and it used total sampling. We analyzed the association of risk factors (age, entry points, sexual risk group, weight, tuberculosis screening) with clinical stage and CD4 counts in pregnant women. Tuberculosis screening, antiretroviral therapy, and CD4 counts have an association with a clinical-stage in pregnant women with HIV with an odds ratio (OR) was 14.6, 12.0, and 0.1, respectively. Besides, only tuberculosis screening has an association with CD4 counts ($p < 0.05$; $OR = 0.144$). Further research is required to investigate the clinical patients' HIV/AIDS in more detail for prevention.

INTRODUCTION

HIV/AIDS is a serious challenge and a double burden in the financial development of the health sector. Cases of HIV/AIDS was increasing from 2015 to 2019 in Indonesia.[1] In May 2019, the number of new cases of HIV-positive reached 7,036, while the cumulative AIDS cases reached 50,282.[2] The human immunodeficiency virus (HIV), attacks body's immune system. HIV makes the body vulnerable to some potentially life-threatening infections and cancers by weakening the body's defenses against disease. HIV is infectious, which means it can be transmitted from one person to another.[3]

HIV can be transmitted through sex, blood transfusion, sharing needles from mother to child (perinatal), and breastfeeding from HIV mothers[4] Heterosexual risk factors were the highest at 70%, followed by homosexuals at 22% and perinatal at 2%. Our previous research conducted in 2018 showed that the prevalence of HIV in pregnant women was 9.09%.[1,5]

East Java is the first largest contributor to HIV in Indonesia in 2019 and the third-largest of AIDS cases after Papua, with the new cases of AIDS and HIV reaching 958 and 8.935%, respectively. This number continues increasing every year, including in Gresik Regency. In 2019, this prevalence was the third-highest in East Java and still increasing until now in Gresik Regency. While the cumulative AIDS cases of the reproductive group (30–39 years old) reached 396 cases, 61.32% of sufferers were male and 61 of them died.[6]

The number of HIV patients aged <20 years was 4.55%[5] and dominated by factory workers at 28.16%, followed by housewives at 19.65%, and drivers at 18.52%.[7] The high population migration has triggered the increasing prevalence of HIV/AIDS. Gresik Regency is an industrial city with 63 large industries and 324 medium industries in the fields of agriculture, mining, trade (export-import), fisheries, warehousing, transportation, forestry, real estate, and services.[8] So that many residents come from outside Gresik Regency.

The reports of cases of HIV/AIDS are still cumulative and not specific. For example, the prevalence of HIV/AIDS among pregnant women was difficult to find. The effect of HIV on pregnant women correlated with the health status of the fetus and the baby. The HIV transmission from mother-to-child was indicated by the finding of HIV and AIDS cases in the age group under 4 years (1.8%), 5–14 years (0.9%), and 15–19 years (2.9%).[2] Therefore, this study aims to determine the risk factors, clinical stage, and CD4 cell counts in pregnant women with HIV. The risk factors in this study including its characteristics, the levels of adherence to taking antiretroviral (ART) drugs, and the entry points of HIV cases.

MATERIALS AND METHODS

A survey-based study was carried out in the Voluntary Counseling and Testing (VCT) Polyclinic at Ibnu Sina Hospital, Gresik, Indonesia. An observational study was done in 4 months from April to July 2018. This study used secondary data from January 2013 to June 2018 in our institution. We conducted a study on pregnant women who were diagnosed with HIV (reactive) in 18 sub-districts at Gresik, East Java. The sampling technique in this study was total sampling. We analyzed the association of risk factors (age, entry points, sexual risk group, weight, tuberculosis screening) with clinical-stage and CD4 cell counts in pregnant women.

The data collected were patient demographics, entry points patients, sexual risk group, infection opportunistic, clinical-stage, Cluster of Differentiation 4 (CD4) cell counts, antibiotics history, adherence to taking ART, tuberculosis screening, and diagnostics. The age data were divided into two groups - those

low risk (20–35 years) and high risk (<20 years and >35 years). The basis for this classification of pregnant women was based on the risk of pregnancy in the Risk Factor I group (Potential Obstetrical Problems) based on the Pudji Rochjati Score Card (KSPR).[9]

The sexual risk in this study just has two groups were heterosexual and bisexual. Entry point patients are where HIV (diagnostic) cases are found in pregnant women. The entry point data were inpatients, outpatients, Maternal, and Child Health Polyclinic (MCHP), and others. We just looked at the clinical stage from pre-symptoms and symptoms. CD4 (differentiation cluster 4) is a marker that is on the surface of human white blood cells, especially lymphocyte cells. In this study, we divided the subjects into two groups: CD4 under 350 and CD4 above 350. The data analyzed in SPSS version 25. We calculated the relevant descriptive statistics for demographics patients and questionnaire items. In univariate analysis, we used frequency and percentages for the categorical variables and logistic regression for bivariate analysis.

RESULTS AND DISCUSSION

A total of 39 cases of HIV/AIDS in pregnant women were treated at the Ibnu Sina Hospital between January 2013 and June 2018. This study described the HIV/AIDS characteristics and risk factors, location of initial HIV screening, case finding entry points, clinical stages, antibiotic history, antiretroviral therapy (ART) administration, adherence levels of taking ART drugs, CD4 cell counts, and TB screening in pregnancy. The results of mapping of HIV/AIDS cases among pregnant women in Gresik Regency are known to be the most cases in border areas with high population mobility and urban areas with high migration.

Table 1 shows a univariate analysis of pregnant women with HIV. Based on their age, they have a low risk (79.5%) for complications along with pregnancy and they have had education only until senior high school (59.0%). The most case finding entry points of cases were in Maternal and Child Health Polyclinic (64.1%). All of the patients were heterosexual (53.8%) and none were infection opportunistic (94.9%). The clinical-stage of pregnant women in pre-symptoms (74.4%) and CD4 was under 350 cells (51.3%). Most of the patients had negative tuberculosis (94.9%) and used antiretroviral therapy (89.7%).

Table 2 shows the logistic regression of the clinical-stage in pregnant women with HIV. Tuberculosis screening, ART therapy, and CD4 cell counts have an association with the clinical-stage in pregnant women with HIV significantly with an odds ratio (OR) of 14.6, 12.0, and 0.1, respectively. Table 3 describes the result of the logistic regression of CD 4 in pregnant women with HIV. From all variables, only tuberculosis screening has an association significantly with CD4 cell counts.

The prevalence of age 20–25 years was 79.5%, which showed that the pregnant women with HIV were in reproductive and active sexual activities. The findings relate to the fact that

Table 1 Univariate analysis of pregnant women with HIV

Variables	Patients n (%)
Age	
Low risk (20–35 years)	31 (79.5)
High risk (<20 and >35 years)	8 (20.5)
Education	
Elementary school	3 (7.7)
Junior high school	12 (30.8)
Senior high school	23 (59.0)
Graduated	1 (2.6)
Entry point patients	
MCHP	25 (64.1)
Outpatients	4 (10.3)
Inpatients	2 (5.1)
Others	8 (20.5)
Sexual risk group	
Heterosexual	21 (53.8)
Bisexual	18 (46.2)
Infection opportunistic	
Yes	2 (5.1)
No	37 (94.9)
Clinical-stage	
Pre-symptoms	29 (74.4)
Symptoms	10 (25.6)
Weight	
<50 kg	8 (20.5)
50–60 kg	15 (38.5)
>60 kg	16 (41.0)

Variables	Patients [n (%)]
CD4	
<350	20 (51.3)
≥350	19 (48.7)
Antibiotics	
Yes	5 (12.8)
No	34 (87.2)
Tuberculosis screening	
Yes	11 (28.2)
No	28 (71.8)
Tuberculosis diagnostics	
Negative	37 (94.9)
Positive	2 (5.1)
ART	
Yes	35 (89.7)
No	4 (10.3)

Source: Medical records at Ibnu Sina Hospital, 2013 – 2018.
MCHP: Maternal and Child Health Polyclinic; ART: Antiretroviral therapy

Table 2 Logistic Regression of clinical stage in pregnant women with HIV

Variables	Beta	Standard Error	Significance	Odds Ratio (OR)
Age	1.052	1.140	0.356	2.864
Entry point	-0.582	0.458	0.204	0.559
Sexual risk group	-0.208	0.734	0.777	0.813
Weight				
<50 kg reff				
50–60 kg	0.588	0.399	0.528	1.800
>60 kg	-0.288	0.110	0.740	0.750
Tuberculosis screening	2.680	0.875	0.002*	14.583
Antiretroviral therapy	2.485	1.230	0.043*	12.000
CD4	-2.690	1.121	0.016*	0.068

*$p < 0.05$; ART: Antiretroviral therapy.

Table 3 Logistic Regression of CD4 in pregnant women with HIV

Variables	Beta	Standard Error	Significance	Odds Ratio (OR)
Age	0.575	0.814	0.480	1.778
Entry point	0.121	0.120	0.314	1.128
Sexual risk group	-0.095	0.643	0.882	0.909
Weight				
<50 kg reff				
50–60 kg	0.000	0.894	1.000	1.000
>60 kg	1.204	0.753	0.110	3.333
Tuberculosis screening	–1.939	0.872	0.026*	0.144
ART	–1.156	1.203	0.337	0.315

* $p < 0.05$; ART: Antiretroviral therapy

almost all pregnant women with HIV were married; they had risk of transmission through the sexual activity because all pregnant women with HIV were heterosexual. This is similar to the results of qualitative research conducted by Aisah, 2010. She found that risk factors for HIV/AIDS transmission among migrant workers include risky sexual relations, sexual relations with violence (rape), sexual relations with HIV-infected people without protection, visiting brothels, commercial sex workers, and paid sex.[10]

Education is the main factor in creating attitude and behavior. This study showed that the majority of pregnant women infected with HIV were junior and senior high school. All of the pregnant women infected with HIV were all working mothers, the level of education was certainly related to the

job of these women. Low levels of education tend to have less knowledge about HIV/AIDS. Previous studies reported that the level of education was significantly related to prevention and treatment efforts.[11] The decision to start ART therapy depends on the level of education and knowledge about the therapy. Besides, HIV testing increased based on levels of education.[12]

A Qualitative study related to the sexual behavior of HIV-infected people has reported that these people had sexual activity two or three times a week.[13] Mostly, the entry point of HIV cases in pregnant women was in the MCHPs of public health centers, not in hospitals. This condition could be influenced by the community and health service provider or health programs. VCT Polyclinics was one of the public health centers that be the first place of reference for midwives, doctors, and the community for HIV/AIDS patients, including pregnant women with HIV during the first-time screening. Based on that, screening was important for prevention. Prenatal screening can inform the risk of mother-to-child transmission, so that it can prevent death. Screening accurately detects HIV infection during pregnancy and the ART associated with an evident reduction in risk.[14]

This study reported 71.8% of pregnant women with HIV did not do tuberculosis screening in health service. Tuberculosis screening, ART therapy, and CD4 cell counts have an association with a clinical-stage in pregnant women with HIV significantly. Besides, tuberculosis screening has an association significantly with CD4 cell counts.[15] The ministry of health in Indonesia stated that the higher the number of virus in the body makes the CD4 cells count low, so it can increase the probability of AIDS and death.[16]

Tuberculosis is common in people with Stage 4 HIV. Tuberculosis screening can reduce mortality by 57% in people with HIV stage 3 or 4. It also was very beneficial for the high-risk population such as inpatients and people with advanced HIV. The high-sensitivity test of tuberculosis can reduce the mortality with the highest risk or advanced clinical stage.[17] Tuberculosis is significantly more common in people with lower CD4 cell counts.

The HIV patients with CD4 T-lymphocyte counts less than 200 cells/µl were two times more likely to be infected with tuberculosis. In general, the main predictors of TB/HIV coinfection were having advanced clinical disease, smoking, and alcohol consumption.[18] HIV infection occurred among the younger age group in tuberculosis patients significantly. There was an increased risk of death, treatment failure, and recurrence in patients who are positive for TB and HIV. This could be due to immunosuppression or the negative effects of pharmacokinetics caused by the treatment of HIV infection.[19]

The low identification of CD4 cell counts in pregnant women infected with HIV in the Gresik Regency was possibly due to the lack of funding and resource factors. The cost of check-up for CD4 cell count was expensive, so it just conducted if the patients have symptoms and need advanced treatment. The CD4 cell counts in pregnant women are inverse with the number of viral loads. The lower the CD4 cell count is, the higher the viral load in pregnant women. A study in South Africa reported that 96 of 654 HIV outpatients were diagnosed with active tuberculosis and 28 patients with subclinical disease. The mean CD4 cell count was 68 (interquartile range 39–161) cells/mm³ in patients with active tuberculosis, 136 (72–312) cells/mm³ in patients with subclinical disease, and 249 (125–394) cells/mm³ in those without tuberculosis (P<0.001).[19]

This study has several limitations. The lacking availability of data related to HIV/AIDS. Besides, the community's negative stigma about HIV/AIDS makes pregnant women afraid to come to clinics or health services, so it tends to hide their illness. It makes cases of HIV/AIDS like the iceberg phenomenon that only a small proportion are known.

CONCLUSIONS

Most of the HIV infections in pregnant women are at the age of active sexual activity. But the Clinical-stage in pre-symptoms has low CD4 cell counts. Tuberculosis screening, ART, and CD4 cell count were associated with a significant clinical stage. However, only tuberculosis screening was associated with CD4 cell counts significantly. Public health center programs must be optimized. VCT could be used as an initial screening effort for HIV/AIDS cases in pregnant women. Resources in the MCHPs as the entry point for newly pregnant women with HIV must be strengthened. Access to HIV counseling and testing services must be expanded by making HIV testing become a standard in all health facilities at the basic and comprehensive levels, starting from independent practice, health centers, clinics, hospitals, and laboratories. The prevention of HIV transmission from mother to child could be optimized by monitoring the consumption of antiretroviral drugs in pregnant women and increasing the cooperation with various sectors in providing socialization and education about HIV/AIDS to more communities.

ACKNOWLEDGEMENTS

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