

Factors that Influence the 5-Year Survival Rate of HIV-AIDS Patients in Kariadi Hospital Semarang, Indonesia

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Abstract—HIV/AIDS is one of the diseases that cause death in many countries, and it requires serious attention. Survival rate of the HIV/AIDS patients is determined by many factors, like viral load, CD4, age, gender, clinical stage, depression, and family support. This research was intended to discover the factors that influence the 5-year survival rate of patients with HIV/AIDS in Kariadi Hospital Semarang. This research was an observational analytic study using cohort retrospective method with 108 samples. Data is collected from medical record and then tested using chi square statistic test. In this research, patients who survived the 5 years: 48 (62.3 %) male patients, 64 (66.7 %) patients were under 45 years old, 32 (76 %) patients were clinical stage I and II, 43 (75.4 %) patients with CD4 count above 50 cell/mm³, 61 (92 %) viral load <400 copy/ml. From the four variables (viral load, CD4, age, gender), clinical stage I-II ($p = 0.010$), CD4 count > 50 cell/ml ($p = 0.001$) and viral load < 400 copy/ml ($p = 0.001$) were influence the 5-year survival rate of HIV/AIDS patients. On the other hand, gender ($p = 0.680$) and age ($p = 0.205$) weren't influence. Factors that influence the 5-year survival rate of HIV/AIDS patients in Dr. Kariadi Hospital Semarang were clinical stage I-II, CD4 count >50 cells/ml and viral load <400 copy/ml, while factors that have no affect to 5-year survival rate were gender and age.

Keywords— HIV/AIDS, 5-year survival rate, clinical stage, CD4, viral load.

I. INTRODUCTION

HUMAN immunodeficiency virus (HIV) is one of the retrovirus that infects the cells of immune system, destroying it or impairing it's function. When the infection takes place, the immune system is weakened and makes the body more susceptible to further infection [1]. This condition makes the body vulnerable to several diseases called opportunistic infection that normally would not affect people with normal immune system. Those infections can develop to AIDS (Acquired Immune Deficiency Syndrome) [2]. The examples of opportunistic infection is oral candidiasis, pulmonary tuberculosis, extrapulmonary tuberculosis, chronic

diarrhea and some typical infectious diseases that are targeting the eyes, skin, and nerve systems [3].

HIV/AIDS is one of the diseases that is causing deaths in many nations, therefore HIV/AIDS needs a serious attention. HIV/AIDS patients are reported to rise in number each years [4]. In Indonesia, the number of new case of those infected with HIV/AIDS is still stable or even decreasing but the number of HIV/AIDS patients still increasing [5].

Survival rate of HIV/AIDS patients is determined by viral load, age, gender, nutritional status, CD4 count, and clinical state of the patient. Viral load in plasma and T-cell CD4 count affect the progression of HIV/AIDS disease. The higher the viral load, the lower of CD4 count. Higher viral load triggers a fast HIV/AIDS progression in host's body [6]. In a research done by Homayoon Farzadegan, et al. in Atlanta, they discovered that viral load in female human is lower than male human, even with the same CD4 count [7].

Earlier study in Taiwan discovered that early diagnosis of HIV/AIDS clinical stages combined with ARV therapy can increase HIV patient's survival rate [8]. The higher the CD4 count in HIV patient at the start of ARV therapy, the higher the survival rate [9].

Nutritional status holds a key position in HIV/AIDS infection. Nutritional management based on macronutrient and micronutrient can also influence the acceptance of antiretroviral (ARV) drugs and promote HIV patient's immune status. Therefore, the survival rate of the patients is longer if they have good nutrition [10].

Age influence the progression of AIDS with older patients having a quicker progression of AIDS, and with it, the patients have a lower survival rate. This is caused by a decreasing function of immune system to produce immune cells [1].

Fact that mortality of HIV/AIDS patients is high, and that there is no research regarding HIV/AIDS has been conducted in Dr Kariadi Hospital so far, has motivated us to do research about factors that influence the 5-year survival rate of HIV/AIDS patients in Dr. Kariadi Hospital Semarang.

II. METHOD

This research was an observational analytic study using cohort retrospective method. Data was collected between March to June 2013 in Dr. Kariadi Hospital Semarang using patient's medical records. Total samples in this research were 108 HIV/AIDS patients. Selection was based on inclusion criteria (patients who were diagnosed with HIV/AIDS in 2008, either still alive or not) and exclusion criteria (HIV/AIDS patients with incomplete data in his/her medical record, comprised with height, weight, hemoglobin, albumin, and viral load).

This research received ethical clearance from the research ethics committee of Faculty of Medicine of Diponegoro University, and received permit from Dr. Kariadi Hospital Semarang. Required data in medical records in this research is viral load, age, gender, CD4 count, and clinical stages. In fulfilling the principle of research ethics, we keep the data regarding our research subjects' identity as confidential.

All collected data in this research is analyzed using univariate analysis and presented using descriptive method, then, using bivariate analysis to find out the connection between independent variables with dependent variable using chi-square test. If the result does not meet the requirement of chi-square test, Fisher Exact test is used.

III. RESULT

Of the 108 research samples, 66 patients (66.1 %) survived the first 5 years, while the other 42 patients (38.9 %) have died within that period.

Of the 77 HIV/AIDS male patients, 48 patients (62.3 %) survived the period while the other 29 patients (37.7 %) has died within the period. On the other hand, of the 31 HIV/AIDS female patients, 18 patients (58.1 %) survived the period while the other 13 patients (41.9 %) has died.

Of the patients who were 45 years of age or older, 2 patients (33.3 %) survived the period and 4 patients (66.7 %) has died within the period. And of the patients who were younger than 45 years of age, 64 patients (62.7 %) survived the period and 38 patients (37.3 %) has died within the period.

Based on the clinical stage of HIV/AIDS patients, the patients were divided into 2 groups (the 1st group was clinical stage I and II, the 2nd group was clinical stage III and IV). Of the patients diagnosed with HIV/AIDS in clinical stage I and II (1st group), 32 patients (76.2 %) survived and 10 patients (23.8 %) has died. Meanwhile, of the patients diagnosed with HIV/AIDS in clinical stage III and IV (2nd group), 34 patients (51.5 %) survived and 32 patients (48.5 %) has died.

Patients diagnosed with HIV/AIDS with CD4 count ≥ 50 cells/mm³ are 57 patients, with 43 of them (75.4 %) survived the period and 14 of them (24.6 %) has died within the period. However, there are patients diagnosed with HIV/AIDS with CD4 count < 50 cells/mm³ and still survived the 5-year period,

23 patients (45.1 %). The other 28 patients (54.9 %) have died within the period.

Of the patients who had viral load > 400 copy/ml, 5 (8.0 %) survived the period and 39 (93.0 %) has died within the period, and of the patients who had viral load < 400 copy/ml 61 (92 %) survived the period and 4 (7.0 %) has died within the period.

After analyzing four factors that influence the survival rate of HIV/AIDS patients in Dr. Kariadi Hospital Semarang, we identified two factors with the most significant influence: clinical stage and CD4 count. This statement is based on the P value < 0.05 , and based on the value of odds ratio between both factors that shows CD4 (OR = 3.739) being the most influencing factors in the 5-year survival rate if compared to clinical stage (OR = 3.012). While the 2 other factors, gender and age, showed no significant influence because the P value > 0.05 .

TABLE I Analysis of Chi-Square test with multiple factors that influence the 5-years survival rate of HIV/AIDS patients in Kariadi Hospital Semarang

Variable	HIV/AIDS Alive		HIV/AIDS Dead		Significancy (p)	Odds Ratio (95% CI)
	n	%	n	%		
Gender						
Male	48	62.3	29	37.7	0.680	1.195
Female	18	58.1	13	41.9		
Age						
≥ 45 years	2	33.3	4	66.7	0.205	0.297
< 45 years	64	62.7	38	37.3		
Clinical stage						
I and II	32	76.2	10	23.8	0.010	3.012
III and IV	34	51.5	32	48.5		
CD4						
≥ 50 cell/mm ³	43	75.4	14	24.6	0.001	3.739
< 50 cell/mm ³	23	45.1	28	54.9		
Viral Load						
> 400 copy/ml	5	8.0	39	93.0	0.001	
≤ 400 copy/ml	61	92.0	4	7.0		

IV. DISCUSSION

A. Sample Characteristic

From 108 samples, 66 patients (66.1 %) survived the first 5-years period while the other 42 patients (38.9 %) has died within that period. This is similar with the 1st trimester of 2013 report on HIV-AIDS published by the Republic of Indonesia's Ministry of Health that states alive AIDS patients is higher in number (35,059 patients) than dead AIDS patients (8,288 patients) [12].

B. Gender

From the data collected and processed based on gender using chi-square method, the P value = 0.680. P > 0.05 means there is

no significant influence between gender and the 5-year survival rate of HIV/AIDS patients in RSUP Dr. Kariadi Semarang. There is not any research that examines the influence between HIV/AIDS patient's gender with the 5-year survival rate of HIV/AIDS patients. In other research, they just report the distribution of HIV/AIDS patients in male group or female group, whether they were dead or alive. It was similar with the research which was done by Santoro Lopes, et al. in Brazil. They stated that mortality in female HIV/AIDS patients is higher (52 %) than in male (36 %) [13].

According to research done by Timothy R. Sterling, the initial level of HIV-1 RNA is lower in female than male, but the progression rate to AIDS between male and female showed no significant difference [14].

C. Age

Result of chi-square analysis about the correlation between age with the 5-year survival rate is P value = 0.205. This value shows that there was no significant influence between the age of HIV/AIDS patients with their survival rate. This result contradicts A. Babiker, et al. research. They proclaim that age is one of the factors highly correlated with survival rate [15]. Research in France and Spain claim that older age have high progression to turned into AIDS and lessening survival rate [16].

D. Clinical Stage

Data analysis which done in 108 samples to find the influence between clinical stage with the 5-year survival rate of HIV/AIDS patients in RSUP Dr. Kariadi Semarang showed a significant influence with P value = 0.010. This result matched with N. French, et al. research in Uganda, claiming that patients diagnosed with HIV/AIDS in clinical stage III and IV have lower survival rate if compared to patients diagnosed with HIV/AIDS in clinical stage I and II [17]. Same as the research done by Samuel S. Malamba, et al., who concludes that mortality rate increases significantly with higher clinical stage [18].

E. CD4 Count

The P value = 0.001 which was obtained by analysis in 108 samples showed a significant influence between CD4 count with the 5-year survival rate of HIV/AIDS patients in Dr. Kariadi Hospital Semarang. Cohort study performed by Ehmann WC, et al. presents a similar result that CD4 count < 50 cells/mm³ in HIV/AIDS patients have a higher mortality rate if compared to HIV/AIDS patients with CD4 count ≥ 50 cells/mm³ [19]. Other research that supports this results claims that HIV/AIDS patients with CD4 count 50 cells/mm³ due to delay in diagnosis or delay in treatment have lower survival rate if compared to HIV/AIDS patients with CD4 count 300 cells/mm³ and has started ARV (antiretroviral) treatment [20],[21].

F. Viral Load

The P value = 0.001 which was obtained by analysis in 108 samples showed a significant influence between viral load with

the 5-year survival rate of HIV/AIDS patients in Dr. Kariadi Hospital Semarang. Cohort study performed by Ehmann WC, et al. presents a similar result, that viral load > 400 copy/ml in HIV/AIDS patients have a higher mortality rate if compared to HIV/AIDS patients with viral load < 400 copy/ml [19].

V. CONCLUSION

This research shows that factors which influences the 5-year survival rate of HIV/AIDS patients are clinical stage and CD4 count, with CD4 count and viral load being the greater influence than the clinical stage. This research also shows us that gender and age do not influence the 5-year survival rate of HIV/AIDS patients.

VI. RECOMMENDATION

We need to pay attention about the content, lab results, and file storage of patients medical record. We also need to do further research about factors that influence the 5-year survival rate of HIV/AIDS patients. The further research may use different methods and larger samples to know exactly what factors that influence the 5-year survival rate of HIV/AIDS patients using cohort study.

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