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Factors That Influence Immunity Status in PLWHA (People with HIV/AIDS) in Kuningan District, 2018

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HIV continues to be a significant global public health issue, namely the still high transmission of infections, morbidity, and mortality. In Indonesia, HIV cases reported up to December 2016 were 86,780 cases and in Kuningan, up to December 2016, there were 186 HIV cases and 335 AIDS cases dominated by productive age. The impact of the decline in immune function in AIDS patients is very worrying because this syndrome has led to an increase in the morbidity and mortality rate of the population in the productive age. The absence of a dominant factor influencing the immunity of PLWHA in Kuningan Regency. Research Objectives to determine the dominant factors related to immunity status in PLWHA in Kuningan District. This type of observational analytic study with a cross-sectional study design with a sample of 85 people. Data collection techniques with document observation and interviews with PLWHA, while the analysis that will be carried out is univariate analysis, bivariate with Spearman test and multivariate analysis with logistic regression test. Results of bivariate analysis of nutritional status (p -value = 0.002), smoking behavior, consumption of ART (p -value = 0.00), TB-HIV co-infection (p -value = 0.00), and physical activity (p -value = 0.002) and the results of multivariate analysis of ARV consumption (p -value = 0.003). Conclusion there is a relationship between nutritional status, smoking behaviour, consumption of antiretroviral therapy, TB-HIV co-infection, and physical activity with immunity status and consumption of antiretroviral therapy is a dominant factor associated with the status of PLHIV immunity. PLWHA need to routinely consume ART to improve immunity.

Keywords: Immunity, PLWHA, Kuningan.

1. INTRODUCTION

HIV is health issues continue to be dominant global society, with the high transmission of infection, morbidity and mortality rate of more than 35 million people. In 2015, as HIV causes many as 1,1 (940.000–1,3 million) million people dying. Besides that, as many as 36,7 (34,0–39,8), million people living with HIV which are 2,1 (1,8–2,4 million) people become infected with HIV [1].

AIDS cases cumulatively in Indonesia reported until December 86.780 2016 some cases spread in 407 (80%) of 507 district/cities around provinces in Indonesia. They are domination by reproductive age the age 20–29 years (31,4%), followed age group 30–39 years (30,6%), age group 40–49 years (12,8%), age group 50–59 years (4,5%). And age group 15–19 years (2,7%). Case Fatality Rasio (CFR) AIDS decline from 1,16% in 2015 be 1,11% in December 2016 [2].

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In West java showed cumulatively HIV AIDS from 1987 until December 2016 there are 18.727 HIV case and 4.919 the AIDS case. Prevalence of HIV/AIDS cases in West Java in 2016 of 11,43% increased from 2014 which 9,73% [3]. In Kuningan Districts until December 2016 which are 186 cases and 335 cases [4]. An increase in the prevalence of caused risk factors the transmission of HIV and AIDS cases included most through heterosexual (67,8%), drug uses (10,5%), homosexual (4,1%), and mother to child transmission (3%) [2].

Human Immunodeficiency Virus (HIV) is retrovirus attacked cells of the human immune system (especially CD4 it T-cells and macrophages main immune system) cells, and destroy or annoying functions. A viral infection has caused a decline in immune systems, which resulted in an immune deficiency. Acquired Immunodeficiency Syndrome (AIDS) described various symptoms and an infection that is related to the decline in the body immunity system. A system of immunity is a mechanism whereby a defence of the body, tissue, and molecules

mediates the occurrence of resistance against infection. HIV infection is set as the cause of AIDS, levels of HIV in the body and the emergence of various infections certain is an indicator that HIV infection has grown become AIDS [5].

HIV infection can be diagnosed through rapid diagnostic tests (RDTs), which detect the presence or absence of HIV antibodies. This immune function is measured by looking at the CD4 count indicator the impact of the decline in immune function in people with AIDS is very considered. The impact of the decline in immune function in people with AIDS is very worrying because this syndrome has caused an increase in the morbidity and mortality rate of the population in the productive age. As the virus destroys and damages the function of immune cells, infected individuals gradually become immunodeficient. Immunodeficiency causes increased susceptibility to various types of infections, cancer, and other diseases so that people with a healthy immune system can fight [1].

The function of immunity in People with HIV/AIDS (PLWHA) is influenced by several factors, age, nutritional status, smoking behaviour, a combination of Anti Retroviral (ART), comorbid health conditions, and physical activity [6–8]. Physical activity can be used for effective and comprehensive HIV and AIDS management [9]. Unknown to the dominant factors that affect the immunity of PLWHA, research on immunity status is needed to assess the health conditions of PLWHA to be able to improve their quality of life, physical and emotional status and by delaying AIDS-related complications [10].

2. RESEARCH PURPOSES

The general purpose of this study was to analyze the dominant factors associated with increased immunity in PLWHA in Kuningan District. The specific purpose of this study was to determine the relationship between age, nutritional status, smoking behaviour, the combination of ART, TB-HIV co-infection, and physical activity with the status of PLHIV immunity.

3. METHODS

The type of observational analytic study with the cross-sectional approach with the population in this study were all HIV sufferers who were recorded in RSUD 45 Kuningan until July 2018. The samples in this study were surviving adult PLHIV who had visited the 45 Kuningan EDelweis clinic and meet the inclusion and exclusion criteria as many as 85 respondents. The inclusion criteria were as follows: PLWHA who were willing and able to do a Viral Load and CD4 examination. While the exclusion criteria are: do not come to follow the service. the sample withdrawal used was nonprobability sampling which was carried out using “Exhaustive Sampling.”

namely PLWHA who had complete medical records and conducted health checks in the Kuningan Regency area which would be used as the research sample. The method used to collect data using primary data and secondary data. Primary data is taken directly from respondents and secondary data is taken from medical records of RSUD 45 Kuningan. The research location is RSUD 45 Kuningan West Java. This research has been conducted for 8 months, starting from February 2018–September 2018. The variables in this study consist of independent variables and dependent variables. Independent variables were nutritional status, smoking behaviour, consumption of ART, TB-HIV co-infection, and physical activity while the dependent variable was immunity status in PLHIV. The analysis used in univariate analysis with Spearman test and multivariate analysis with multiple logistic regression.

4. THE RESULT

The results of the analysis as presented in Table I.

Table I. Results of bivariate analysis.

	Imunitas				Total	P value
	CD4 > 350		CD4 ≤ 350			
	n	%	n	%		
ARV consumption						
Routine	26	54	22	46	48	0,000
Not a routine	5	14	32	86	37	
TB co-infection						
Yes	22	58	16	42	38	0,000
No	9	19	38	81	47	
Physical activity						
Minor	12	63	7	37	19	0,002
Medium	15	41	22	59	37	
Hard	4	14	25	86	29	
Nutritional status						
Normal	14	47	16	53	30	0,002
Fat	11	61	7	39	18	
Routine	6	16	31	84	37	

Table II. Multivariate analysis result.

Model	Variable	Unstandardized coefficients		Standardized coefficients	p
		B	SE	Beta	
Model 1	TB co-infection	−1,414	0,576	1.243	0.014
	ARV consumption	1,735	0,631	5,668	0.006
	Physical activity	1,126	0,421	3,083	0.008
	Nutritional status	0,518	0,341	1,679	1,129
	Constants	−2,967	1,651		0.072
Model 2	TB co-infection	−1,471	0,564	0.230	0.009
	ARV consumption	1,842	0,626	6,308	0.003
	Physical activity	1,132	0,413	3,101	0.006
	Constants	−2,039	1,493		0.130

5. DISCUSSION

5.1. Nutritional Status

The results showed that there was a relationship between nutritional status and immunity status in people with HIV, this was because people living with HIV/AIDS needed nutritional supplements, HIV sufferers were among the vulnerable segments of society [10]. Nutritional status influences innate immune activation through various mechanisms, from altered mucosal barrier defence and microbiomes in malnutrition to the expression of proinflammatory cytokines by vascular stromal cells and adipocyte hypertrophy in obese ones. Similarly, nutritional status will influence modulating T cell activation, proliferation, and function, partly through an endocrine mechanism that is thought to act on T-cell surface receptors [11]. Adequacy of nutrients, especially vitamins and minerals is needed in maintaining an optimal immune system [12]. The interaction between HIV infection and nutrition is significant, and these two factors are interdependent because strategies to improve nutritional status both quantitatively and qualitatively have been shown to have a positive impact on improving immunity in people with HIV infection [10]. Nutritional status affects independent survival from CD4 counts [13]. In children with severe nutritional disorders with HIV infection affect low CD4+ [14].

Nutritional support intended to improve immune function will reduce the incidence of complications associated with HIV infection, slowing the progression of HIV infection [15]. Nutritional intervention and proper exercise can be beneficial in reducing the symptoms of HIV infection [16]. Optimal nutrition can improve the quality of life of people with HIV [17]. It can also slow the progression of HIV infection to AIDS. Nutrition is essential at every stage of infection [17, 18] and ultimately reduces mortality associated with HIV/AIDS, so that good nutritional status with the nutritional intake is the most urgent need for people living with HIV/AIDS. The results of the study [19] showed that the Body Mass Index (BMI) was low, associated with attrition, and with poor nutritional and immunological status at baseline, as well as during treatment of HIV sufferers in Mali.

5.2. TB Co-Infection

The results of the study show that there is the relationship between TB co-infection in HIV patients with immunity status, this is because *Mycobacterium tuberculosis* and the HIV are mutually reinforcing, accelerating the deterioration of immunological functions [20]. HIV coinfection is the most critical risk factor for active TB to develop so that it increases susceptibility to primary infection or re-infection and also the risk of TB reactivation for patients with latent TB. *Mycobacterium tuberculosis* infection also has a negative impact on the immune response to HIV, accelerating the progression of HIV infection to AIDS [20]. TB-HV coinfection presents the most common

cause of death in subjects with HIV and TB-HIV co-infection is also an inhibition in the attempt to terminate TB transmission sequences [10].

The results of Bruchfeld et al. research [20] as much as 33% of PLHIV coverage in resource constraints, high HIV prevalence in Sub-Saharan Africa, having tuberculosis (TB) co-morbid concurrent TB and HIV immune activation and inflammation and complicating diagnosis, presentation and clinical management of each disease [21]. A study in South Africa showed that CD4 T-cell recovery rates were comparable for people infected with HIV with and without TB [22]. The results of this study indicate that HIV-infected people with active and latent TB have increased levels of inflammation and immune activation [23]. Tuberculosis is still a primary opportunistic infection in PLWHA with the majority of cases occurring at low CD4 counts [24].

5.3. Smoking Behaviors

The results showed that there was a relationship between smoking behaviour and immune status in people with HIV, this is because smoking in the body will change the ability to regenerate, increase immunity, and increase response to antiretroviral therapy (ARV). Value range OR 4.33–5.6 [8]. The behaviour that is carried out every day by PLWHA significantly reduces immune and virologic responses to antiretroviral therapy [25]. Besides, how to populate HIV-infected people [26].

The results of Valiathan, Miguez, Patel, Arheart, and Asthana [27] research showed that smoking and HIV infection independently influence T cell activation and immune function and together they showed the lowest immune system profile. Smoking in people infected with HIV is associated with a higher risk of cancer, infection, and decreased response to antiretroviral therapy [28]. The immune system used in measuring the immunity status of PLWHA is CD4. Smoking in PLWHA will affect viral load and reduce CD4 cell counts, so regular assessment of tobacco use is needed in clinical care settings for PLWHA [29].

5.4. ART Consumption

The results showed that the combination of ART was associated with immunity status, this was because the administration of Antiretroviral therapy was to suppress the amount of HIV until it was undetectable and maintain CD4 cell counts up to more than 25%. The effectiveness of combination ART in PLWHA is directly related to its proven ability to restore HIV-related immune deficiencies, as measured by an increase in post-treatment of CD4 T cells [7]. Giving antiretroviral therapy earlier after being diagnosed with HIV will provide greater immune recovery (immunity) than achieved with deferred ART [30].

The results of Ezeamama et al.(2015) [7] showed that patients with combination ART were associated with

rates of recovery of CD4 T cells based on gender and nutritional status, such as age <40 with ≥40 years in women predicted to experience a rapid recovery in absolute terms CD4 T cells ($p = 0.006$) and patients with Body Mass Index (BMI) ≥18.5 kg/m² with values ($p < 0.001$). Rahman's research results, et al. [31] showed that combination ART significantly reduces transmission of new infections and increases the level of immunity in society, but the treatment itself may not be enough to eliminate the HIV epidemic.

5.5. Physical Activity

The results showed that there was a relationship between physical activity and immunity status in people with HIV, this is because physical activity in PLHIV can help overcome stress-related illness and increase aerobic capacity and cardiopulmonary function and immunity [6]. Physical activity has been included in the disease treatment regimen in people with HIV, this is because physical activity can reduce fatigue, improve muscle strength, increase flexibility, energy, and endurance; and improve the sense of well-being. Physical activity is known to improve immune function and quality of life of people with HIV by improving lung function, breathing, and ventilation and their physical and emotional status and by delaying AIDS-related complications [10]. The amount of aerobic activity and adequate muscle strengthening exercises will improve physical and mental health better for PLWHA [32]. Besides, moderate to high-intensity physical activity can prevent or reduce excessive bone loss in people living with HIV [33]. To be able to carry out activities it is necessary to design appropriate physical activity interventions for PLWHA with good social support because social support plays a significant role in promoting physical activity and eliminating barriers for PLWHA to engage in physical activity [9]. Social support is needed from the family to carry out physical activities, including physical activities that can be done at home. Physical activity at home is an effective strategy to reduce fatigue among people living with HIV/AIDS [34].

6. CONCLUSIONS AND SUGGESTIONS

The conclusions from the results of this study are that there is a significant relationship between nutritional status, smoking behaviour, consumption of ART, TB-HIV co-infection, and physical activity with immunity status and consumption of ART is the dominant factor associated with the status of PLHIV immunity.

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