CORRELATIONS BETWEEN NUTRITIONAL STATUS CHANGES WITH NUMBER OF CD4 CELL CHANGES IN HIV/AIDS PATIENTS

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ABSTRAK

*HIV/AIDS merupakan salah satu masalah kesehatan global yang saat ini belum ditemukan vaksin untuk mencegah virus ini. Jumlah sel CD4 adalah indeks untuk menilai kekebalan pasien terinfeksi HIV. Salah satu faktor yang mempengaruhi kekurangan gizi adalah gangguan fungsi kekebalan tubuh sehingga status gizi pasien akan menurun dan mempercepat perkembangan HIV menjadi AIDS. Tujuan dari penelitian ini adalah untuk mempelajari hubungan antara perubahan status gizi pasien dengan. perubahan sel CD4 dihitung dari HIV/AIDS. Penelitian ini merupakan penelitian observasional dan desain kohort analitis desain retrospektif dengan menggunakan data sekunder dari rekam medis pasien dengan HIV/AIDS. Sampel adalah penderita HIV/AIDS yang berusia mendapatkan terapi lebih dari 18 tahun sejak tahun 2010 dan secara teratur memeriksa CD4 mereka menghitung setiap enam bulan selama 18 bulan dengan 4 kali pengamatan. Ukuran sampel adalah 38 pasien HIV/AIDS dengan menggunakan total sampling. Pengumpulan data meliputi karakteristik pasien, tinggi badan, berat badan, jumlah CD4. Jumlah sel CD4 adalah hasil dari Inspeksi laboratorium, status gizi diukur dengan metode BMI. Hasil dalam penelitian ini tidak ada hubungan antara perubahan status gizi dengan perubahan jumlah CD4 setelah 6 bulan, 12 bulan dan 18 bulan setelah pengobatan. Kesimpulan dari penelitian ini adalah ada hubungan antara perubahan status gizi dengan perubahan jumlah CD4 setelah bulan ke-6, 12 dan 18 bulan terapi. Perlu untuk memberikan informasi dan konseling kepada pasien untuk memeriksa CD4 secara rutin mereka untuk dievaluasi oleh tim medis dan penelitian lebih lanjut dengan menggunakan data primer.(**FMI 2013;49:155-162**)*

Kata kunci: *sel CD4, HIV/AIDS, berat badan, BMI*

ABSTRACT

*One of the factors that influence nutritional deficiency is a disorder of the immune function so that the nutritional status of patients will decline and accelerate the progression of HIV to AIDS. The purpose of this research was to study the correlation between changes of nutritional patient status with change of CD4 cell counted of HIV/AIDS. This study was observational and analytical cohort design retrospective design using secondary data from the medical records of patients with HIV/AIDS. The sample was HIV/AIDS patients who aged over 18 year-old getting therapy since 2010 and regularly check their CD4 count every six months for 18 months with 4 times the observations. The sample size was 38 patients HIV/AIDS by using total sampling. Data collection includes patient characteristics, height, weight, CD4 count. The CD4 cell count was the result of laboratory Inspection, nutritional status measured by BMI method. The results in this study there was no correlation between changes in nutritional status with changes in CD4 cell count after 6 months, 12 months and 18 months after treatment. The conclusion of this study is no correlation between changes in nutritional status with changes in CD4 cell count after month 6, 12and 18months of therapy. Need to provide information and counseling to patients to check their CD4 regular basis in order to be evaluated by a medical team and further research using primary data.(**FMI 2013;49:155-162**)*

Keywords: CD4 cells count, HIV/AIDS, weight, BMI

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INTRODUCTION

An infectious disease Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) is a worldwide health problem that has not found a vaccine to prevent the virus. The spread of HIV/AIDS is very fast, so that deaths from HIV/AIDS is still not under control (Nasronudin et al 2008). According to UNAIDS (2011) in 2009, the incidence of HIV in the world at 33.4 million and an increase of 34 million by the end of 2010. In Indonesia, the incidence of HIV/AIDS has increased from year to year. Based on the report from the Director General of Disease Control and Environmental Health Department of the Republic of Indonesia in June 2011, ranging from 2008 to June 2011 HIV cases increased by about 60% of cases. If used as the cumulative number of HIV/AIDS cases by 26 483 cases. HIV is a retrovirus that is included in the

family of lentiviruses that can attack the immune system and the resulting decline in endurance, so that to infection and illness. CD4 cells are important in the collaborative creation of an immune response against foreign agents and the main target of the HIV virus (Onyago et al 2011).

One of the factors that can influence the development of the CD4 count is nutrition. The role of nutrition is very important for HIV patients in supporting the healing of illness, so that will have an impact on improving the quality of life of patients with HIV. When a person is infected with HIV, then the person will experience a disruption of the immune system to a more severe level to a decline in nutritional status. The decline in nutritional status is due to inadequate food intake resulting from various things, such as infectious disease, causing increased nutrient requirements (Ministry of Health, Republic of Indonesia 2010). Research conducted Vonter et al (2009), says that there is a relationship between CD4 cell count and weight between CD4 cell count and nutritional status. This research was conducted at the Clinic of Infectious Disease Care Unit Intermediates (IDCUI) is one of the clinic's in Dr. Soetomo Hospital providing care to patients with HIV. This research was conducted with the common goal to analyze the correlation between changes in nutritional status with changes in CD4 cell counts of HIV/AIDS.

MATERIALS AND METHODS

This study is observational and analytic retrospective cohort design. The population in this study was patients with HIV/AIDS outpatient care and antiretroviral therapy from January to December 2010 as many as 360 patients. The samples in this study were patients aged over 18 years, which has been upheld HIV positive by a doctor. This study is observational and analytic retrospective cohort design. The population in this study was patients with HIV/AIDS outpatient care and antiretroviral therapy from January to December 2010 as many as 360 patients. The samples in this study were patients aged over 18 years, which has been upheld by a doctor HIV positive, antiretroviral therapy, CD4 examination and measurement of weight and height regularly and periodically for 18 months from 2010-2011. The sampling method used total sampling method and obtained a sample size of 38 patients.

The study was conducted at the UPIPI Clinical Dr. Soetomo Hospital Surabaya. The study was conducted at the Clinical Hospital UPIPI Dr. Soetomo Surabaya. Data collection was conducted from January 2010 to December 2011. CD4 is measured by looking at changes in laboratory results every 6 months and nutritional status is measured by looking at changes in body mass index (BMI). Data obtained through secondary data collection from patient medical colleagues subsequently processed using SPSS, and then to determine how the correlation between changes in the nutritional status of patients with the changes in CD4 cell counts of HIV/AIDS Spearman correlation test was used.

RESULTS

Characteristics of patients with HIV/AIDS can be seen in Table 1.

Table 1. Distribution of HIV/AIDS Based on Clinical Characteristics of Patients in UPIPI Clinic Dr. Soetomo Hospital in the Year 2010

Characteristics	n	%	Mean±SD
Age of patients with HIV / AIDS			
18-29 years	12	31,6	34±9 years
30-40 years	17	44,7	
> 40 years	9	23,7	
Sex of the patient			
Man	19	50,0	-
Female	19	50,0	
Level of Education			
Not attending school	1	2,6	
SD	4	10,5	-
SMP	3	7,9	
High School	25	65,8	
University	5	13,2	

Most patients gain weight after observation in the 12th month and 18th month as many as 17 patients (44.7%) and 19 patients (50.0%).

Table 2. Distribution of HIV/AIDS patients by changes in body weight at the UPIPI Clinic Dr. Soetomo Hospital Year 2010-2011

Change in Body Weight	Observation					
	Month 6		Month-12		Month-18	
	n	%	n	%	n	%
Down	1	2.6	5	13.2	1	2.6
No Change	19	50.0	16	42.1	18	47.4
Increased	18	47.4	17	44.7	19	50.0

At the beginning of the observation most patients' BMI was in the normal category were 18 patients (47.4%) at month 6, and 12 months-18 also were in the normal ranges as much as 52.6%, 68.4% and 68, it's just that there is a 4% increase in the number of patients with HIV/AIDS.

Table 3. Distribution of HIV/AIDS patients by BMI changes in UPIPI Clinic Dr. Soetomo Hospital in the Year 2010-2011

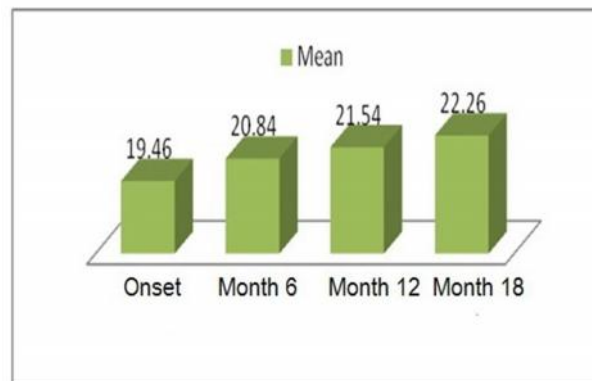| BMI	Observation							
	Beginning		Month 6		Month 12		Month 18	
	n	%	n	%	n	%	n	%
Severe Underweight	11	28.9	9	23.7	5	13.2	2	5.3
Thin Light	6	15.8	3	7.9	1	2.6	3	79
Normal	18	47.4	20	52.6	26	68.4	26	68.4
Mild Obese	1	2.6	3	7.9	3	7.9	3	7.9
Obese Weight	2	5.3	3	7.9	3	7.9	3	7.9

Figure 1. Average BMI Respondents HIV/AIDS patients before and after antiretroviral therapy in UPIPI Clinic Dr. Soetomo Hospital on 2010 – 2011

Table 4. Distribution of HIV/AIDS patients by changes BMI in UPIPI Clinic Dr. Soetomo Hospital on 2010-2011

Change in IMT	Observation					
	Month 6		Month-12		Month-18	
	n	%	n	%	n	%
Down	1	2.6	5	13.2	1	2.6
No Change	19	50.0	16	42.1	18	47.4
Increased	18	47.4	17	44.7	19	50.0

Table 5. Distribution of HIV/AIDS by CD4 cell count in UPIPI Clinic Dr. Soetomo Hospital the Year 2010-2011

Observations	Changes	CD4 cell count after antiretroviral therapy					
		< 200 µl		200-350 µl		> 350 µl	
		n	%	n	%	n	%
6th month	decline	1	2.6	1	2.6	0	0
	not changed	0	0	0	0	0	0
	increase	16	42.1	6	15.8	14	36.8
12th month	decline	3	7.9	0	0	10	26.3
	not changed	0	0	0	0	1	2.6
	increase	7	18.4	0	0	17	44.7
18th month	decline	3	7.9	0	0	11	28.9
	not changed	0	0	0	0	0	0
	increase	3	7.9	0	0	21	55.3

Atopic Dermatitis on initial observations amounted to 19.46. Later observations 6th month of 20.84, the 12th month of 21.54 and at month 18 was 22.26. Changes in nutritional status assessment in this study are done by looking at the change in BMI categories of patients with decreased, unchanged and increased. The results showed that the majority of patients with HIV/AIDS has increased IMT after observation at month 12 and 18 of 17 patients (44.7%) and 19 patients (50.0%). Changes in CD4 cell counts were measured by looking at the difference in CD4 cell counts were measured every 6 months. Changes in CD4 cell counts of patients with category decreased, unchanged and increased. In six months there was an increasing number of CD4 although the CD4 count is below 200 mL by 16 patients (42.1%). In addition a total of 14 patients (36.8%) have shown a considerable improvement of high achievement CD4 count> 350 mL after 6 months of observation. Six months later an increase in the CD4 count is increased until the 18th month. This increase led to patients at

month 12 and month 18 had CD4 cell counts> 350 mL. Based on an average figure 2 average CD4 count at baseline was 95.76 ARV therapy. At 6 months the average CD4 count was 284.5, the 12th month is 317.55, and the 18th month is 337.39.

Based on Table 6 is known that HIV/AIDS patients who experienced an increase in CD4 cell count and changes in body weight followed by a total of 18 patients (47.4%) in the observation of the 6th month. There is also experiencing an increase in CD4 cell count, but not accompanied by changes in body weight were 17 patients (44.7%). In observation of the 12th month most of which have increased the amount of weight but did not change as many as 12 patients (31.6%). In the 18th most experienced increases in CD4 count and weight changes followed by as many as 13 patients (34.2%) and the CD4 cell count had increased but no change in body weight followed by 11 patients (28.9%).
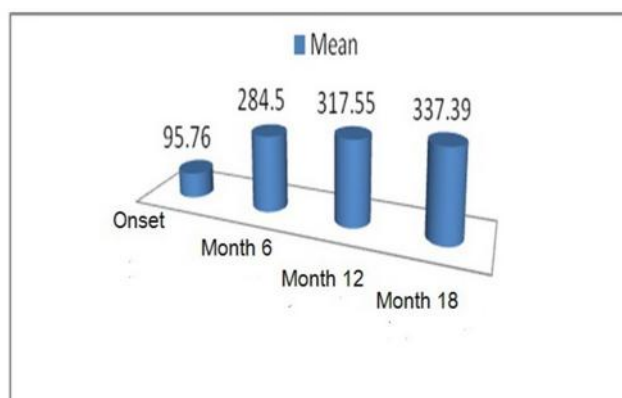

Figure 2. Mean CD4 cell count Respondents HIV/AIDS patients before and after antiretroviral therapy in UPIPI Clinic Dr. Soetomo Hospital on Year 2010-2011.

Table 6. Changes in the distribution of CD4 HIV/AIDS patients by Weight Change in UPIPI Clinic Dr. Soetomo Hospital on Year 2010-2011

Observation	Changes In Body Weight	Changes in CD4 cell counts					
		decreased		Unchanged		Rises	
		n	%	n	%	n	%
6th month	decline	0	0	0	0	1	2.6
	not changed	2	5.3	0	0	17	44.7
	increase	0	0	0	0	18	47.4
12th month	decline	4	10.5	0	0	1	2.6
	not changed	4	10.5	0	0	12	31.6
	increase	5	13.2	1	2.6	11	64.7
18th month	decline	1	2.6	0	0	0	0
	not changed	7	18.4	0	0	11	28.9
	increase	6	15.8	0	0	13	34.2

Table 7. Changes in the distribution of CD4 HIV/AIDS patients by Nutrition Status Change in UPIPI Clinic Dr. Soetomo Hospital on Year 2010-2011

Observation	Changes In Nutrition Status	Changes in CD4 cell counts					
		decreased		Unchanged		Rises	
		n	%	n	%	n	%
6th month	decline	0	0	0	0	1	2.6
	not changed	2	5.3	0	0	17	44.7
	increase	0	0	0	0	18	47.4
12th month	decline	4	10.5	0	0	1	2.6
	not changed	4	10.5	0	0	12	31.6
	increase	5	13.2	1	2.6	11	64.7
18th month	decline	1	2.6	0	0	0	0
	not changed	7	18.4	0	0	11	28.9
	increase	6	15.8	0	0	13	34.2

Based on statistical tests were performed using the Spearman test obtained correlation coefficient (r) and significance values (p) in the 6th. 12th and 18th month is equal to 0.208 and 0.209; 0.171 and 0.305; 0.139 and 0.405 ($p \geq 0.05$). which indicates there is no relationship between weight changes with changes in CD4 cell count after the 6th month, 12th and 18th month of antiretroviral therapy. Based on Table 7 is known that HIV/AIDS patients who experienced an increase in CD4 cell count and changes in body weight followed by a total of 18 patients (47.4 %) in the observation of the 6th month. There is also experiencing an increase in CD4 cell count. but not accompanied by changes in body weight were 17 patients (44.7 %). In observation of the 12th month most of which has increased the number but did not change body weight by 12 patients (31.6 %). In the 18th most experienced increases in CD4 count and weight changes followed by as many as 13 patients (34.2 %) and the CD4 cell count had increased but no change in body weight followed by 11 patients (28.9 %).

Based on statistical tests were performed using the Spearman test obtained correlation coefficient (r) and significance values (p) in the 6th, 12th and 18th month is equal to 0.208 and 0.209; 0.171 and 0.305; 0.139 and 0.405 ($p \geq 0.05$), which indicates there is no relationship between weight changes with changes in CD4 cell count after the 6th month, 12th and 18th month of antiretroviral therapy.

DISCUSSION

Based on the results of this study the majority of patients with HIV/AIDS are in the age range of 30-40 years and the average patient infected with HIV/ AIDS at the age of 34 years. This is similar to a study conducted by Mankatittham et al (2009), which says that the average age of 34 years research respondents. Age 34 years is a productive age range with sexually active period. One of the transmission of HIV/AIDS is the sexual relationships with people living with HIV/AIDS (Nursalam & Kurniawan 2011). Based on sex, the respondents in this study of patients with HIV/AIDS as great with 19 people (50.0 %). Based on the level of education in this study the majority of respondents of patients with HIV/ AIDS is high by 25 patients (65.8 %) were somewhat higher education level.

HIV infection will affect the nutritional status (macro and micronutrient) as well as the immune system of people with HIV/AIDS (Batterham 2005). The nutritional status of patients with HIV/AIDS is strongly influenced by the needs and nutrient intake. Nutrient intake that does not meet the requirements due to HIV infection will cause chronic malnutrition. It is necessary for good nutrition containment procedures that patients with HIV/AIDS can maintain the health and nutritional status and improve immune system (Divson 2005). Nutritional status has been associated with immune status and function, including cytokine levels, and the risk of opportunistic infections, all of which are likely to lead to the development of faster HIV disease (Wafaie et al 2001).

One of the methods in the assessment of nutritional status in adults is a BMI (Body Mass Index). BMI is a simple tool to monitor the nutritional status of adults in particular with regard to the deficiency and excess weight (Supariasa et al 2012). From the results of this study largely IMT HIV/AIDS patients before antiretroviral therapy is in the normal category and there is an increasing number of patients with HIV/AIDS are normal nutritional status after receiving ARV therapy. Average BMI of patients with HIV/AIDS from the beginning of therapy until month 6, 12 and 18 have increased.

According to Forrester et al (2001), an increase in BMI was associated with an increase in CD4 cell count and

with lower rates of events that characterize the progression of HIV disease. Many are found, patients who started antiretroviral therapy with low BMI, low immunity and are at stage III or IV experience nutritional, immunological response and functional worsening (Tafese et al 2012). CD4 count is a way to assess the immune status of people living with HIV (Ministry of Health Republic of Indonesia 2011). The lower the CD4 count indicates that the immune decreasing, so the pathogens causing the infection can enter the body together (Fletcher & Kakuda 2005).

Results of statistical analysis to determine the correlation between changes in nutritional status with CD4 count changes using Spearman's test there was no association between nutritional status changes with changes in CD4 cell counts at 6 months (p = 0.209), 12 (p = 0.305) and 18 (p = 0.405) after receiving ARV therapy. When viewed under cross-tabulation between CD4 count change with changes in nutritional status after receiving ARV therapy most patients with HIV/AIDS have increased BMI and CD4 count every 6 months.

In a study conducted Kiefer et al (2011) found no association between BMI and change in CD4 cell count from pre- antiretroviral therapy until visit 6, 12 and 24 months after antiretroviral therapy. There is the possibility of inaccuracies in the measurement of nutritional status prior to treatment. If you look at the results of cross tabulation between the change in CD4 cell count and nutritional status of patients with HIV/AIDS after antiretroviral therapy are at an increased majority of BMI with increased CD4 cell count at month 18. This suggests that the increase in CD4 cell count is related to nutritional status. One of the indicators in addition to BMI is weight loss associated with HIV deaths. Weight loss is the criteria used in the international classification of diseases HIV infection (Castetbon et al 2001). According to Supariasa et al (2012), weight atropometric measurement is the most important and most often used to look at changes in a short time due to changes in food consumption and health. HIV/AIDS affects nutrition through energy expenditure and decrease food intake, decreased absorption of foods and complex metabolic changes that will lead to weight loss and wasting syndrome occurs in AIDS stage (Piwoz & Bentley 2005).

From the results of this study largely weight change at month 6 after receiving antiretroviral therapy do not experience changes in body weight, but in the 12th and 18 patients with HIV/AIDS was gaining weight even though the number of patients who did not experience weight changes are not much different from the number of patients who experienced an increase in body weight.

According Macallan et al (1995), Changes in body weight may be associated with reduced nutritional intake and increase protein decrease in whole body. Losing weight is not an indicator that is used intentionally to see the progression of disease and death in patients with HIV/AIDS (Suttmann et al 1995) and a low CD4 count. In this study most of the CD4 cell count before antiretroviral therapy is below 200 mL. After 6 months of HIV patients receive antiretroviral therapy patients had a CD4 cell count increased to the 18th month CD4 cell count had increased to over 350 mL. Average CD4 count of patients before treatment was 95.76 and at month 6 hampi increased 3 times greater than prior antiretroviral therapy. It can be concluded that increased the most were led to an increase in CD4 cell count was at 6 months after antiretroviral therapy. The increase in CD4 cell counts showed good immunological response to antiretroviral therapy. Higher CD4 cell counts are better.

However, normal CD4 count means the immune system has not fully recovered (Spiritia 2012). Trend changes in CD4 cell count after antiretroviral therapy, increases in CD4 count has decreased the number of patients from the 6th month. According to the Ministry of Health Republic of Indonesia (2011), Provision of antiretroviral therapy will increase the number of CD4. This will continue for many years with effective therapy. These circumstances do not sometimes occur, especially in patients with very low CD4 cell counts at the start of antiretroviral therapy. Data CD4 cell count at the start of antiretroviral therapy and CD4 progression were evaluated every 6 months is needed to determine the presence of immunological therapy failure.

Results of statistical analysis to determine the relationship between changes in CD4 counts with weight changes using Spearman's test there was no association between CD4 cell count changes with changes in body weight at 6 months (p = 0.209), 12 (p = 0.305) and 18 (p = 0.405) after receiving ARV therapy. When viewed under cross-tabulation between changes in CD4 counts with weight changes after antiretroviral therapy, most patients with HIV/AIDS have increased body weight and CD4 count every 6 months. According to Yasin et al (2011) with an increase in CD4 cell count was not always followed by an increase in body weight. HIV/AIDS patients who respond to an increase in CD4 cell counts as a result of an improvement in the body's immune system and do not always respond to an increase in weight that can be used as a marker of clinical conditions. Clinical response to antiretroviral therapy may not be associated with immunological response to assessment of response to antiretroviral therapy as a whole can not be done together using CD4 count and weight. As well as research conducted by

Olawuni (2006), also reported the same result ie no relationship between CD4 cell count increases with the increase in the number of weight loss in patients with HIV/AIDS. However, there is a positive correlation between an increase in CD4 cell count and an increase in body weight with long antiretroviral therapy and Wanke et al (1998) changes in body weight and BMI did not correlate with changes in CD4 count and plasma HIV-RNA in patients on HAART.

CONCLUSIONS

No correlation between the absence of weight change with changes in CD4 cell count and there is no correlation between changes in nutritional status with changes in CD4 cell counts at 6 months of observation, 12 and 18 months in patients with HIV and AIDS in Hospital Dr. Atopic Dermatitis in 2010 until 2011.

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