

Relationship Between Immunity Level and Quality of Life among Housewives Living with HIV (Cross-sectional Study in Central Borneo, Indonesia)

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In Central Kalimantan Province, housewives constitute the second largest group of people with HIV (+) (19.4%) after the private group. Most of them (61.4%) reported on the poor quality of life, especially in the domain of psychology due to frustration and poverty. In its management, the intervention program has not fully integrated the life quality of people with HIV toward the accepted treatment model because of the lack of information about the case. Therefore, the particular study aims to find out the relationship between quality of life and the level of immunity of housewives with HIV (+), which expect to have benefited the development of a program for managing ODHA in Central Kalimantan Province. Cross-sectional study approach used in the research where the population is a housewife with HIV (+) who lives in Central Kalimantan Province. The purposive sampling technique used to select the sample with criteria of the subjects have a CD4 > 200 cell/ μ L and are excluded when experiencing psychiatric disorders and/or dying. There were 54 people as the sample. Data were analyzed bivariate using chi-square test and multivariate analysis with logistic regression. The results of statistical tests showed no significant relationship between quality of life and the level of immunity of participants in the physical domain ($p = .2.071$); psychological domain ($p = 0.610$); social domain ($p = 0.595$); environmental domain ($p = 0.393$); perception of health conditions ($p = 0.317$) and; perception of quality of life ($p = 2.140$). It needs further assessment toward the total number of CD4 before starting ART, treatment adherence, disease history and lifestyle of the participants. And, interventions can improve the quality of life and increase the immunity of participants

Keywords: HIV/AIDS, Housewives, Level of immunity, PLWHA, , Quality of life.

Indonesia has the 3rd largest prevalence of HIV infection in Asia Pacific, with the annual rate of new cases reaching 16%.¹ In 2018, the cumulative number of people with HIV was 242,699 and those with AIDS was 87,453. Central Borneo is the largest province on the island of Borneo, Indonesia. Compared to other regions

in the country, the HIV infection prevalence in this province is low, with a cumulative number of people with HIV at 810 in 2017.² Although the number of cases in the province is relatively small, there are particular challenges in dealing with HIV infection. The absence of donor agencies is an additional obstacle for peer support groups (PSG)

and related agencies in providing management and assistance for people living with HIV / AIDS (PLWHA) that reach all regions of Central Borneo.³

Based on data from the Ministry of Health, housewives provide the largest proportion of women living with HIV / AIDS. In 2018, HIV housewives had the second largest proportion of PLWHA (19.4%), higher than commercial sex workers (7.4%).² The most significant risk factors for housewives are related to their partner's (husband's) sexual behavior, sexual coercion, and low condom use.⁴ In addition, HIV-positive housewives have many burdens. Apart from having to take care of their children and husband, they sometimes also have to be the breadwinners. This can be a psychological stress factor for housewives that can affect their quality of life. Based on the recommendations of the World Health Organization (WHO), the quality of life of PLWHA is an important measure to show their health status based on their own perceptions.⁵

Previous studies have shown an association between quality of life of PLWHA and the outcome of ART treatment, including the success of virological, immunological, and clinical symptoms.⁵ Preliminary studies has shown that 61.4% of HIV-positive housewives in Central Kalimantan Province, have poor quality of life, especially at the level of psychological stress. However, there is insufficient information to assess the impact of quality of life for PLWHA on the success of ART treatment in Central Kalimantan Province. In its implementation, the management model for PLWHA is not yet fully comprehensive that integrates the patient's quality of life with the treatment received.^{3,6}

Based on the background, this study aims to determine the association between quality of life and immunity level of HIV-positive housewives. These findings are expected to provide information for all parties in the development of programs for handling PLWHA, especially for HIV-positive housewives.

MATERIAL AND METHODS

The research design was a cross-sectional study to determine the relationship between quality of life and level of immunity in HIV-positive housewives in Central Borneo, Indonesia.

Population and Sample

The population was HIV-positive housewives in Central Borneo who visited VCT (Voluntary and Testing) clinics in hospitals for monitoring and treatment from November 2018 to March 2019. We got the number of housewives with positive HIV was 130. The sample inclusion criteria were having a CD4 count: ≥ 200 cells / μL and the exclusion criteria were having a CD4 count < 200 cells / μL , being seriously ill, or having a psychiatric disorders. From the inclusion and exclusion criteria, a total of 54 samples were obtained. After the blood samples were taken, participants who met the criteria were contacted by phone the next day.

Data collection on demographics, quality of life and level of immunity of participants

The data was obtained by structured interviews by researchers and the demographic data of the participants was confirmed in the hospital medical records. Variables were the women's age, marital status, ethnicity, occupation, education, partner work, HIV phase, CD4 monitoring, viral load monitoring, affordability of health facilities, family support, and involvement in peer support groups. To assess participants' immunity levels, baseline CD4 levels were measured, before collecting other data. Participants were interviewed in their homes or in a mutually agreeable place. The Indonesian version of the WHO Quality of Life-BREF (WHOQOL BREF) measured the participants' perceptions of their position in life in the context of culture and values in which individuals live and in relation to goals and concerns about the disease. Researchers explained the WHOQOL instrument and how to complete it. Participants who could not read or write were assisted by researchers.

Data Analysis

The level of immunity level was categorized according to CD4 cells/ μL : clinical category A (latent) with CD4 > 500 cells/ μL and category B (symptomatic) with CD4 of 200 \leq 500 cells/ μL . The category C (AIDS phase) with the number of CD4 lymphocytes < 200 cells/ μL was excluded in this study due to various evidence suggesting that patients who have progressed to the AIDS phase generally have a poor quality of life. The participants' levels of immunity were divided into 2 categories: (1) Bad = CD4 > 200 -

500 cells/ μ L) and (2) Good = CD4 > 500 cells/ μ L. The quality of life indicators were divided into two categories : (1) Bad = the score \leq the median, and (2) Good, the score > the median.⁵

Data analysis included univariate, bivariate and multivariate analyses. Univariate analysis explored the characteristics of participants' age, education level, employment status, job, marital status, immunity level, CD4 monitoring, viral load monitoring, affordability of health facilities, family support, membership in peer support groups, and participants quality of life. A series of chi-square tests determined the statistical significance of variables to be used for multivariate analysis. Logistic regression explored the relationship between participants' quality of life and the level of immunity, having removed possibly confounding variables during bivariate analysis. Results were considered significant if $p < 0.05$.

Ethical Consideration

The study received approval from the Health Research Ethics Commission, Faculty of Medicine, Lambung Mangkurat University, Indonesia (No.955/KEPK-FK UNLAM/EC/X/2018). Researchers explained the study's purpose, objectives, and procedures prior to obtaining the written consent of those who volunteered to participate. Data were analyzed in the aggregate to ensure confidentiality of all information obtained.

RESULTS AND DISCUSSION

The results showed that there is no relationship between quality of life and the level of immunity of housewives with HIV (+) in Central Kalimantan Province. This study found out that the majority of participants had a good quality of life, but, on the contrary, it also shows a low level of immunity with a CD4 value: 200- \leq 500 cells/ μ L (71.9%). Nevertheless, they are optimistic about living their lives, which is shown by high satisfaction toward health conditions (88.89%) and always have positive perception toward the quality of life (79.63%).

In general, changes in status tended to affect participants' lives when they first found out that they were diagnosed with HIV (+). Various responses appear such as depression, hopelessness, insecurity, and suicidal thoughts. However, most

participants admitted that these symptoms only appeared in the first year after being diagnosed with HIV (+). In the following years, respondents tend to motivate themselves to fight diseases such as learning to accept fate and be grateful.

Gratitude is a coping mechanism that forms positive attributions that can help prevent stress and depression.⁷ Self-acceptance and gratitude make a person feel happier, more optimistic and more satisfied in life. Women who act as wives and mothers tend to have higher gratitude than men because of the existence of social relations and freedom to pursue goals and the nature of openness in expressing feelings.⁸ There are differences in the level of gratitude between women and men ($p = 0.003$); women have higher gratitude ($M = 36.52$) than men ($M = 33.48$).¹⁰ In this study, the respondents' gratitude and acceptance of their status as people with HIV (+), made them have the quality of a better life, especially in the physical domain and the social domain.

However, this study did not show a relationship between quality of life and level of immunity of respondents in the physical, psychological, social, environmental, perceived health conditions and satisfaction with the quality of life of respondents ($p > 0.05$). In addition, previous studies have shown that the quality of life for women with HIV/AIDS tends to vary and there is no change after treatment.⁹ There is a significant relationship between the level of immunity shown by CD4 cells and the physical quality of life for PLHIV domain ($p = 0.001$), and psychological domain ($p = 0.043$). The higher the quality of life of the patient, the higher the patient's ability to fight disease and the better the quality of life which is the goal of HIV treatment and an indicator of successful ARV.¹⁰

Several findings indicate that a decrease in the quality of life of PLWHA will affect the level of immunity. For example, bad psychological conditions will shape the behavior of PLWHA to avoid or reduce their efforts to seek support or treatment.¹¹ In addition, social indicators, awareness of stigma and psychology also contribute to changes in the immune system as measured by CD4 cell count among people with HIV ($p = 0.001$). PLWHA with high social relationship scores tended to have higher endurance than their peers who had low social support.¹²

Table 1. Distribution of Sociodemographic and HIV Characteristics of among study Participants

Characteristic	Immunity Level		Total, n =54
	Poor , n= 41	Sufficient, n=13	
Age			
< 37 years, %	21 (51.2)	8 (61.5)	29 (53.70)
≥ 37 years, %	20 (48.8)	5 (38.5)	25 (46.29)
Respondent Occupation			
Not Work, %	30 (73.2)	7 (53.8)	37(68.51)
Work, %	11 (26.8)	6 (46.2)	17 (31.48)
Educational Background			
Low, %	22 (53.7)	8 (61.5)	30 (55.55)
High, %	19 (46.3)	5 (38.5)	24 (44.44)
Marital Status			
Widow, %	12 (29.3)	5(38.5)	17(31.48)
Marriage, %	29 (70.7)	8 (61.5)	37(68.51)
Husband/Partner Work			
Civil Servant / Indonesian Army/Police, %	2 (4.87)	1 (7.69)	3 (5.55)
Private Employess, %	25 (60.97)	8 (61.54)	33 (61.11)
Salesman/Trader, %	1 (2.43)	0 (0.0)	1 (1.85)
Driver, %	1(2.43)	1(7.69)	2 (3.70)
Labor, %	1(2.43)	1(7.69)	2 (3.70)
Farmer/Fisher, %	2 (4.87)	2 (15.38)	4 (7.40)
Honorary, %	8 (19.51)	0 (0.0)	8 (14.81)
Others	1 (2.43)	0	1(1.85)
Number of Children			
> 3 children, %	7 (17.03)	2 (15.38)	9 (16.66)
1-3 children, %	27 (65.85)	8 (61.53)	35 (64.81)
0 child,%	7 (17.03)	3 (23.07)	10 (18.51)
Length of time diagnosed with HIV			
≥ 3years, %	25 (60.97)	5 (38.46)	30 (44.44)
< 3 years, %	16 (39.03)	8 (61.53)	24 (55.55)
Phase of HIV			
Symptoms of AIDS, %	17 (41.46)	4 (31.53)	21 (38.88)
Asymptomatic, %	24 (58.53)	9 (69.23)	33 (61.12)
Monitoring of CD4			
Not Routine, %	36 (87.80)	6 (46.15)	42 (77.77)
Routine, %	5 (12.19)	7 (53.84)	12 (22.23)
Monitoring of Viral Load (VL)			
No, %	41 (100.0)	13(100.0)	54 (100.0)
Yes, %	0(0.0)	0 (0.0)	0 (0.0)
Affordability of Health Facility			
Poor, %	25 (60.97)	9 (69.23)	34 (62.96)
Enough, %	16 (39.03)	4 (30.77)	18(33.33)
Family Support			
No, %	35 (85.37)	5 (38.46)	40 (74.07)
Yes, %	6 (14.63)	8 (61.54)	14 (25.92)
Involvement of Peer Support Groups			
No, %	16 (39.02)	9 (69.23)	25 (46.30)
Yes, %	25 (60.97)	4 (30.76)	29 (53.70)

In this study the average quality of life of the participants was good, but on the contrary, most (79.1%) had poor immunity (CD4 = 200-d"500 cells / μ L). Previously, it had been shown that the survival trend of HIV patients was determined by the CD4 cell count before they started the ARV therapy phase. People with HIV who started ARV therapy with low CD4 cells experienced faster AIDS phase, which was marked by a decrease in CD4 cells. If patients are detected and treated earlier, immunity levels can be maintained.¹³ However, this study does not have sufficient information to prove whether low levels of

respondents' immunity are associated with their CD4 cell level before starting ARV treatment. And, this study only limited CD4 cells at the time of the study and was associated with the respondents' quality of life.

On the other hand, the patient's immunity level is an indicator of the successful of ARV treatment after virological and clinical indicators. Virological failure is the first sign of failure of ARV treatment. After that, it will be followed by immunological failure, and the last, clinical failure will occur which is characterized by an opportunistic infection. The guidelines for HIV

Table 2. Rating of Quality of Life, Perception of Quality of Life, Satisfaction of Health Among Partisipants

Quality of life	Frequency N=54	
	Poor	Good
Physical, %	28 (51.85%)	26 (48.14%)
Psychology, %	34 (62.96%)	20 (37.04%)
Social, %	28 (51.85%)	26 (48.14%)
Environment,%	25(46.29%)	31 (57.41%)
Perception toward the quality of life,%	11 (20.37%)	43 (79.63%)
Satisfaction of health,%	6 (11.11%)	48 (88.89%)
Mean, %	22 (40.74%)	32 (59.26%)

Table 3. Association of Quality of Life and Immunity Levels of Partisipants

Quality of life	Immunity level		OR	P-value	95 % CI Lower-upper
	Poor n=41	Sufficient n=13			
Physical Domain					
Bad	19 (46.3 %)	9 (69.2%)	0.384	2.071	0.102-1.449
Good	22 (53.7%)	4 (30.8%)			
Psychological Domain					
Bad	27 (65.9%)	7 (53.8 %)	1.653	0.610	0.466-5.870
Good	14 (34.1%)	6 (46.2%)			
Social Domain					
Bad	20 (48.8%)	8 (61.5%)	0.644	0.595	0.166-2.128
Good	21 (51.2%)	5 (38.5 %)			
Environmental Domain					
Bad	18 (43.9%)	7(53.8%)	0.671	0.393	0.192-2.348
Good	23 (56.6%)	8 (46.2%)			
Perception toward quality of life					
Bad	6 (14.63%)	5 (38.46%)	1.371	2.140	1.154-1.629
Good	35 (85.36%)	8 (61.54%)			
Satisfaction of Health Condition					
No	4 (9.75%)	2 (15.38%)	0.595	0.317	0.096-3.692
Yes	37 (90.24%)	11 (84.61%)			

/ AIDS control issued by the WHO recommend CD4 monitoring to be done every 6 (six) months during treatment to monitor immunology for ART through additional CD4 counts after ART failure. Meanwhile, viral load testing is recommended every 12 months to detect treatment failure or resistance. CD4 and viral load were continued and treatment should not be continued if laboratory results showed a viral load > 1000 copies / ml.¹⁴

Lack of monitoring of HIV viral load in limited resources supports the accumulation of resistance and possibly hinders second-line therapy. Without viral load monitoring, the risk of drug resistance increased with duration of ART and was associated with lower CD4 + T cells at the start of ART.¹⁵ Clinical immunological monitoring without viral load testing resulted in frequent errors in unnecessary treatment. Prolonged treatment failure is indicated by extensive NRTI cross-resistance. Therefore, patient access to virological monitoring should be expanded to prevent inappropriate treatment, allow early detection of failure and maintain second-line treatment options.¹⁶

In its implementation, most participants (77.77%) are not routine scheduling the monitoring CD4 and 100% of respondents never take schedule for viral load monitoring. In general, those who monitor CD4 are participants of Social Healthcare Insurance (BPJS). Meanwhile, those who do not have health insurance, they do CD4 monitoring when they experience symptoms of opportunistic infection, here, laboratory tests are needed as a basis for determining further treatment. Similar to immunological monitoring (CD4), most of the participants consider that viral load is not an important stage, even some of them have never heard the viral load monitoring in the management of HIV/AIDS.¹⁶

These conditions indicate the participants' low awareness and knowledge about HIV/AIDS, which assume relating to education level, access to information, health services, socio-economic conditions, and family support. The finding showed that the majority of participants had a low education level (55.55%) which most of them only graduated from junior high school. Those with higher education have adequate knowledge about HIV/AIDS compared to people with low education. Therefore, education is the most effective way to fight against HIV/AIDS because,

through education, the dangerous disease can be controlled, managed and prevented.¹⁷ In one side, the respondent meets the economic problems, where the majority of respondents does not work (68.51%). In this case, they had a high dependency economy for husband/family for daily life need and treatment. However, low family support makes them not free to choose access to recommended treatments.

This condition shows the low awareness and knowledge of participants about HIV / AIDS, which is assumed to be related to education level, access to information of the health services, socio-economic conditions, and family support. The results showed that most of the participants had low education level (55.55%), most of them only graduated from junior high school. Those with higher education have more knowledge about HIV / AIDS than those with low education. Therefore, education is the most effective way to fight HIV / AIDS because through education the disease can be controlled, handled and prevented.¹⁷

From the aspect of health services, the handling of HIV / AIDS in Central Borneo is still passive because not all hospitals provide ART services. In 2018 there were only 4 VCT clinics in Central Borneo which are located in the district/capital city and have not yet fully reached remote areas. The large area of Central Borneo and limited access to transportation are real obstacles for PLWHA to access information and treatment. Although the treatment do not cure HIV / AIDS, they do affect mortality and morbidity, prolong life, improve quality of life, revitalize society and change perceptions about HIV / AIDS from an epidemic to a managed chronic disease.¹⁸

Research in West Java found a trend towards the use of high health services for women with HIV/AIDS that the homes are close to health facilities. But, there is no significant relationship between the distance and the health services in Bandung ($p = 0.217$). However, in Bandung itself, the distance is not an obstacle for PLWHA to access health services due to the complete transportation facilities.¹⁹ The finding of the study shows a contrast result, the distance aspect limits the ability and willingness of housewives with HIV (+) to use health services because transportation facilities in Central Borneo have not fully supported. The finding showed that 62.96%

of participants complain the lack of affordability of health facilities in the distance aspect because health facilities with VCT services are in the capital and not evenly distributed in all regencies/cities in Central Kalimantan Province.

Previous findings indicated that there was a strong relationship between affordability ($p = 0.038$) and VCT utilization by housewives with HIV.²⁰ The further away from the home from health services the more expensive it will be. And the facts show the trend of low utilization of health services. However, the weakness of this study is that the researchers did not look deeper into the obstacles and challenges of local governments in providing affordable ARV care and treatment for PLWHA and distributing it evenly in all districts / cities in Central Kalimantan Province. In this case, the article only collects data and information about access and health services available to PLWHA in Central Kalimantan Province.²¹

In its implementation, the management of PLWHA in Central Borneo was only facilitated by 1 (one) Peer Support Group (PSG) Barigas Bahalap which has a purpose as a place for PLWHA to support and share information with each other. However, the activities carried out by Peer Support Group still show the poor number of activity due to the work area and the lack of available funds. Not only internal factors, PSG also has the problem of the low interest of PLWHA, especially housewives with HIV (+) to join PSG members. The results of the study found that 46.30% of participants did not participate in PSG because their status was kept secret from the public and others. Previously, PLWHA who were supported and joined in PSG proved to have a positive attitude and regular access to health services. The presence of PSG can increase access to knowledge of PLWHA about diseases and enable communication and support in treatment and monitoring.²² It is relevant to previous research conducted in Indonesia that PSG support also has an effect on reducing the depression rate of PLWHA ($p < 0.001$) and improving the quality of life of PLWHA ($p = 0.005$).²³

Besides the importance of these variables, medication adherence is also the key to the success of ARV treatment. Evidences mentioned a relationship between the level of medication adherence and CD4 in patients with HIV/AIDS ($p < 0.05$) as indicated by a decrease CD4 cell and

the emergence of various opportunistic infections ($p < 0.05$).^{24,25} However, this study did not conduct resistance test of ARV treatment undertaken by respondents and did not explore deeper the medication adherence. So, low CD4 could not associate to medication noncompliance and the presence of resistance to ARVs.

Previous research showed that low CD4 cell is not always associated with ART failure but could also associate with other illnesses beside HIV such as cancer, immunosuppressive drugs (corticosteroids and chemotherapy), lifestyle, socio-economic and health facilities.^{26,27,28} Relating with past medical history patients with a history of diabetes and cancer did not show differences in CD4 behavior over time comparing with patients who did not have a history of disease. Likewise, the variables of lifestyle such as smoking, drinking alcohol and drugs reported, during ART, showing CD4 cell drops over time. Also, the aspect of health services, where patients have treatment at referral hospitals show higher CD4 enhancements compared to patients treated in other hospitals.²⁹ Unfortunately, this study did not have information the disease history before HIV infection, behavior and their lifestyles such as smoking, drinking alcohol and drug, and health facilities. Then, low CD4 might not be attributed to these variables.

Other variables not collected such as variable CD4 cell before starting ART, resistance to ARV, level of adherence in treatment, behavior, and lifestyle of patients, history of disease before being diagnosed with HIV, those become significant input for this study. Assessment of these variables may clarify the factors associated with the low level of immunity of the participants. Regardless of the limitations of this study, it has considerable strength and has proven that there is no relationship between the quality of life and the level of immunity of housewives with HIV (+) in Central Kalimantan, but there are other factors that must be considered in managing patients to increase levels of immunity.

CONCLUSION

Based on the results, concluded that there is no relationship between the quality of life and the level of immunity of housewives with HIV (+) in Central Kalimantan, but, other factors such

as CD4 cell before starting ART, duration of ARV use before the study, level medication adherence, history of illness before being diagnosed with HIV/AIDS, behavior, and lifestyle such as smoking, consuming alcohol and drug use, and other drugs consumed in addition to ARVs, need to consider. In this case, comprehensive consideration is needed in the management of PLWHA so that treatment and care can improve the quality of life of patients and increase immunity.

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Conflict Of Interest

There is no conflict of interest in this research.

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