

THE COMMON METHODE USING *RHYNCHOPHORUS FERRUGINEUS* VAR *PAPUANUS* AS NEW FOOD SUPPLEMENT PRODUCT TO HIV AIDS PATIENTS IN JAYAPURA: AN ONGOING RESEARCH

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ABSTRACT

Sago caterpillar (Rhynchoporus bilineatus) is a food and for local communities in Papua is rich in protein and essential amino acids that are useful for the growth and maintenance of body tissues. Sago caterpillar is the larva of the red palm beetle. Sago processed into papeda eaten together with sago that has been roasted without fear of excess cholesterol, because in addition to rich in protein and amino acids caterpillar is also free of cholesterol even when in roast will remove the oil.

Acquired Immune Deficiency Syndrome (AIDS) is a collection of symptoms that caused by a virus (Human Immuno Deficiency Virus) is a contagious and deadly. This ongoing research take 25-49 blood sample of papua's HIV patients. This virus damages the human immune system, resulting in the corresponding loss of his endurance, so easily infected and died of complications of various diseases.

Nutritional status of people living with HIV / AIDS is strongly influenced by the needs and nutrient intake. Intake of nutrients that do not meet the requirements due to HIV infection will lead to malnutrition which is multifactorial, among others due to loss of appetite, impaired absorption of food juices in the digestive tract, fluid loss due to vomiting and diarrhea, impaired metabolism nutrients, and opportunistic infections other concomitant diseases HIV / AIDS.

Method: Analysis Extract Capsules Ingredients Silkworm Sago, Protein Content Test, Fat Content Test, Abu levels, Capsule manufacture Caterpillars Sago, blood analysis CD4 levels, ANOVA.

Keywords: *Rhynchoporus bilineatus, Acquired Immune Deficiency Syndrome, Methode, CD4 levels, ANOVA*

INTRODUCTION

Background

Acquired Immune Deficiency Syndrome (AIDS) is a collection of symptoms that caused by a virus (Human Immuno Deficiency Virus) is a contagious and deadly. This virus damages the human immune system, resulting in the corresponding loss of his endurance, so easily infected and died of complications of various diseases. AIDS is not contagious, infectious HIV that is, the virus that causes AIDS immune achieve future. The virus is found in blood, semen and vaginal fluids, and can be transmitted through contact with the blood or fluid. There are no specific symptoms if a person already infected with HIV, in other words people who have HIV can not be identified through diagnosis of

certain symptoms, in addition to HIV-infected people do not feel pain. Months or even years of someone who is already infected can survive without showing typical clinical symptoms but only looked at the stage of AIDS. (Dwisetyowati. 2013)

AIDS Commission (KPA) Papua province reported that as of October 2012 the number of people living with HIV in Papua Province as much as 13 196 cases and 98% were caused by sex. The highest number of HIV sufferers in the Mimika district and as many as 2,823 cases of Jayapura city of 2,666 cases. By age group, the highest number of HIV patients is in the age range 25-49 years as many as 3,015 cases of HIV and 4,701 cases of AIDS (KPA, 2012).

Various methods of government to minimize the risk of contracting the disease include the Draft Provincial

Regulation (RAPERDASI) Prevention and Control of AIDS, but even then not be able to help. There is even a government plan to close places of prostitution and punish the perpetrators of sex with a heavy penalty.

Some patients who would be gathered in one place and live together as people living with HIV gets assistance from Governmental Organization (NGO), and undergo both mental and physical health regularly by a doctor appointed by the government. HIV patients with stage 1 and 2 who work as sex workers (PSK), as driven by economic needs and the burden of the family are still some people who are free to roam and implement their sexual activity, both in place of prostitution, roadsides and in the woods. Generally they live mingled with the people, got assistance, and its activities are monitored by NGOs. Their health checked at the hospital and argued that by taking antiviral drugs and regular sleep and eating nutritious foods can help boost the body's immune system. Instead of the patients who had entered stage 3 and 4 begin to feel the infections are very made him suffer and need help of others in treatment. (Admosuharto, K. 1993)

Nutritional status of people living with HIV / AIDS is strongly influenced by the needs and nutrient intake. Intake of nutrients that do not meet the requirements due to HIV infection will lead to malnutrition which is multifactorial, among others due to loss of appetite, impaired absorption of food juices in the digestive tract, fluid loss due to vomiting and diarrhea, impaired metabolism nutrients, and opportunistic infections other concomitant diseases HIV / AIDS (Friis, H. 2005; Triwinata, 2006).

Proteins are part of the immune substances (antibodies) that are important in defending the body against infection (Kartasapoetra, 2005). Patients infected with HIV positive, protein breakdown occurs more rapidly in the body so that the concentration of albumin is low, but by increasing the energy input of HIV-infected patients can improve the balance of protein (Jahor, F. et al, 2003). According to Nicholas et al (2003) reported in his study that administration of albumin can improve the body's resistance to stress of HIV infection. While Vaughan, et al (2013) says that there is a significant positive relationship between protein intake with an increased level of CD4 in adolescent males in Kenya.

CD4 is a part of the white blood cells or lymphocytes. These cells are an important part of

our immune system. There are millions of "family" CD4 cells. These cells are also called T-4 cells, helper cells or CD4 + cells sometimes. In addition there is also a CD4 cell CD8 cells, also called T-8 cells or killer cells. CD8 cells that kill cancer cells or virus-infected cells. When HIV infects humans, the cells it infects most often are CD4. HIV becomes part of the cell and a CD4 cells multiply to fight any infection, they also make more copies of HIV. After our long HIV infection, CD4 cell count decreases. This is a sign that the immune system is being weakened. The lower the CD4 cell count, the more likely we are going to be sick. (Infonet 2009) When HIV reduces the number of CD4 cells, some "family" can be eradicated total CD4. If that happens then we lose the ability to fight germs that should be faced by a "family" is, as a result of our experience opportunistic infections. CD4 cell count is a key measure of immune system health. The lower the number, the greater the damage caused by HIV. If the CD4 count below 200, or a CD4 percentage below 14% then we considered AIDS according to the MOH. (www.spiritiacom . 2009).

One factor that affects the CD4 cell count in the blood is the quality of the food. Factor is the quality of food is a priority that needs to be considered, so it needs to be explored further what foods can boost immunity of HIV patients. The more varied and nutritious diet start antiretroviral treatment (ART), the less likely for HIV to flourish and the less likely to die. Cohort study conducted on more than 800 people living with HIV in Uganda. The results showed the importance of the quality of food on the health of people with HIV, an important contribution given the World Food Programme (WFP), World Health Organization (WHO), UNAIDS and PEPFAR have recommended the integration of food aid into AIDS care and treatment programs. From a secondary analysis of the evaluation program that supports the WFP food aid program for people with HIV, a cross-sectional analysis of food consumption shows that each additional nutrient-rich foods associated with a 16% reduction in the likelihood of having a CD4 count at or below 350 (Rawat, R. 2012).

Nutritional status of people living with HIV / AIDS is strongly influenced by the needs and nutrient intake. Intake of nutrients that do not meet the requirements due to HIV infection will lead to malnutrition that are multifactorial, among others due to loss of appetite, impaired absorption of nutrients in the digestive tract, fluid loss due to vomiting and

diarrhea, impaired metabolism of nutrients, opportunistic infections and other diseases comorbid HIV / AIDS (Friis, H. 2005; Tirtawinata. 2006).

Proteins are part of the immune substances (antibodies) are very important for defending the body against infection (Kartasapoetra, 2005). Patients infected with HIV positive, protein breakdown occurs more rapidly in the body so that a low albumin concentration but by increasing the energy input of HIV-infected patients can improve the balance of protein (Jahor, et al., 2003). According to Nicholas, et al (2003) reported in his study that administration of albumin can improve the body's resistance to stress of HIV infection.

Sago caterpillar (*Rhynchoporus bilineatus*) is food and local communities in Papua are rich in protein and essential amino acids that are useful for the growth and maintenance of body tissues. Sago caterpillar is the larva of the red palm beetle. Sago processed into papeda eaten together with sago that has been roasted without fear of excess cholesterol, because in addition to rich in protein and amino acids caterpillar is also free of cholesterol even when in roast will remove the oil.

Local food with high protein content and contains essential amino acids complete indispensable to increase the blood levels of CD4 in patients with HIV. Based on the experience in 2009 when some people with HIV who receive assistance from the Province of Papua YPKM decreased CD4 levels drastically and almost into the AIDS stage, but after being given every day of protein-rich foods such as baked sago which make up and their CD4 levels can live a normal life until now. But it can not be explained scientifically. Based on the above thought to be possible with the provision of sago (*Rhynchoporus bilineatus*) in the diet can raise blood CD4 levels of HIV in the city of Jayapura.

The results could create complementary foods ARV product in capsule form to improve and enhance the immune system of HIV patients so that they can live and work normally like everyone else.

Formulation Of The Problem

One indicator to lengthen the cycle between HIV to AIDS is to maintain the number of CD4 cells in the blood. When the lower the CD4 cell count in the blood, it is increasingly possible for people to experience opportunistic infections and entered the

stage of AIDS. Normal if the levels of CD4 $\geq 14\%$ and $\leq 14\%$ indicates when severe damage to the immune system in AIDS patients and classified. Based on the above, the formulation of the problem in this research is "why the provision of sago (*Rhynchoporus bilineatus*) can increase blood CD4 HIV in Jayapura?"

Research Purposes

General

The general objective of this study was to assess the effect of the capsules sago (*Rhynchoporus bilineatus*) against blood CD4 levels of HIV in the city of Jayapura.

The specific objective of this research is:

1. To determine the type of active protein contained in sago (*Rhynchoporus bilineatus*) participating in the increase of CD4 blood of HIV patients in the city of Jayapura.
2. To determine the safety aspects (pathogenic bacteria and heavy metals) from the capsule sago.
3. Creating new nutritional products in capsule form as a food supplement for ARV for people with HIV in Jayapura.

Benefits Of Research

This study is expected to provide benefits to:

- a. Provincial Government through the Department of Health in order to draw up programs and special policies in me improve the quality of life of people with HIV in Papua Province.
- b. AIDS Commission (KPA) and the Papua Province Governmental Organization (NGO) which has long been involved in the kegiatan assistance, is able to improve the prevention and control of HIV through increased nutritional needs of patients.
- c. The creation of a new discovery for the people and people with HIV if local food such as sago (*Rhynchoporus bilineatus*) can have a positive effect in improving endurance.

TABLE OF SINTESA

NO	Name	SUBJECT	PROBLEMS	VARIABEL	CONCLUSION
1.	Restiana	Effect of extract fish cork against level Albumin and Nutritional status patients with HIV/AIDS to get antiretroviral	Patients with HIV/AIDS got decreasing on nutritional status to repair protein intake and endurance interventions of fish cork approximately repairing the amount of total albumin and nutritional status patients with HIV/AIDS	1. TB, BB, LILA 2. Blood test, regularly, enzyme, heparin, kidney and albumin.	Suplement of fish cork extract proven that total energy intake and total protein increase to the patients with HIV/AIDS statistically.
2.	Jahoor, F. Abraham, S and Heird, W.C	The Protein Metabolic Response to HIV Infection In Young Children	Growth failure often precedes secondary infection in HIV-infected infants and children, suggesting that inadequate protein deposition may be an early manifestation of infection by the virus. However, the protein metabolic response elicited by the virus in young children is unknown. We compare children with HIV infection and age matched children without HIV infection with regard to whole body and splanchnic protein kinetics and synthesis of acute phase proteins (APPs).	1. Protein intake 2. CD4 3. Hb 4. Income 5. Household composition 6. Retinol Binding Protein (RBP) 7. Albumin	Children with HIV infection but without secondary infection have reduced protein balance because of an inability to down regulate protein catabolism. Furthermore, the acute phase protein response elicited by HIV infection is characterized by higher concentration and synthesis rates of positives APPs without lower concentration of some negatives APPs.
3.	S. Bruce Williams, Glen Bartsch, Norma, M, Gary Collins, Subhasree, S.G, David Wheeler,	Protein Intake Is Positively Associated with Body Cell Mass in Weight Stable HIV Infected Men	Wasting has been a common features of the Human Immunodeficiency Virus (HIV) epidemic since its appearance in the early	1. Body composition, height and weight 2. Dietary Recall 3. Muscle Building Activity (MBA)	Among the 467 HIV-infected males included in the study, the mean age was 40 years old and there was a diverse ethnic

	Terry Beirn.		1980s and it is associated with increased morbidity and mortality. Although all body compartments are affected loss of body mass (BCM) is strongly associated with disease progression and predict mortality. Because protein is the principal component of BCM, fluctuations in its metabolism may contribute to clinically important wasting. Studies of whole body protein turnover in HIV patient suggest that it is correlated with BCM and protein intake. This is consistent with finding reported from studied in animals and elderly women and burn patient.		representation. The cohort exhibited relatively advanced HIV disease with a mean CD4 cell count of 104 cell/mm ³ and 54.8% having had at least one ARD. Body composition and macronutrient intake variables included a mean BCM of 28.2 kg and mean daily energy, protein and carbohydrate intakes of 13.97 MJ, 117.9 g and 432.4 g respectively.
4.	Fred R. Sattler, Natasa Rajcic, Bruce Bistran	Evaluation of High-Protein Supplementation in Weight-Stable HIV-Positive Subjects With a History of Weight Loss: a randomized, Double Blind, Multicenter Trial	Hiv Patient with wasting are at increased risk of opportunistic complications and fatality. We hypothesized that augmenting dietary intake with high biologic value protein would enhance weight and lean tissue in weight in weight-stable subject with a prior unintentional weight loss > 3%	<ol style="list-style-type: none"> 1. Study regimens 2. Outcomes Assesments 3. Biochemical 	A whey protein supplement did not increase weight or lean body mass in HIV-possitive subjects who were eating adequately, but it did increase CD4 cell counts.
5.	Mohd, N.M, J. Yeo, et al	Nutritional Status of Children Living With HIV and Receiving Antiretroviral (ARV) Medication in	Nutrition and HIV are closely related. Any immune impartmen as a result of HIV	<ol style="list-style-type: none"> 1. Socio-economis status 2. Nutritional Status 3. Anthropometric 	Dietary assessment showed almost all the children did not achieve

		The Klang Valley, Malaysia.	leads to malnutrition, which in turn, can also lead to reduced immunity, thus contributing to a more rapid progression to AIDS.	<ul style="list-style-type: none"> 4. Dietary Intake 5. Medical History, and 6. Serum Level 	the recommended energy intake for their age groups and almost half of the children did not achieve the RNI for selenium and vitamin A. The study provides an insights on the nutritional status of the children living with HIV.
6.	Vaughan, E., Cardenas, V., Kelser, P	The Impact of Nutrition on CD4 Levels for HIV-positive Kenyan Adults	HIV infection is highly prevalent in Sub Sahara Africa. Many people living with Hiv infection, in region malnourished or food insecure, which may affect HIV outcomes such as CD4 levels.	<ul style="list-style-type: none"> 1. Antropometric data 2. Medical records 3. Intake protein 	Among 122 participants who were eligible for the study, caloric and protein recommended intake respectively, average 68.8% and 102.9% in males and 74.4% and 102.9% in females. There was a statistically significant positive correlation between protein consumption and CD4 levels .

II.LITERATURE

II.1. Overview About Caterpillar Sagu**(*Rhynchophorus ferrugineus var papuanus*)**

Sago worms are the larvae of the red palm beetle (*Rhynchophorus ferrugineus*) and potential as a source of protein. Can be

used as a nutritious side dish (without cholesterol) or substitute materials fodder. As for the content of nutrient composition contained in sago worms can be seen in Table 1 below.

Table 1. Chemical composition of Silkworm Sagu (dried at 70 ° C)

NO	KOMPOSITION	TOTAL
1.	Protein	34.79
2.	Lipid	54.03
3.	Water	8.42
4.	Ash	2.70
5.	Fiber	1.60

(Sources : Purnamasari.2010)

The results of the analysis of amino acid content using RP-HPLC and spectrophotometer obtained 16

amino acids, 8 of which are equally essential amino. More details can be seen in table 2.

Table 2. Composition of the Essential Amino Acids in Silkworm Sagu (dried at 70 ° C)

NO	TYPE ESSENSIAL AMINO ACIDS	TOTAL (Mg/g)
1.	Isoleucine	88.53
2.	Leucine	130.79
3.	Lysine	110.00
4.	Methionine	32.44
5.	Phenylalanine	74.18
6.	Tryptophan	39.45
7.	Threonine	70.52
8.	Valin	103.07

(Sources : Purnamasari. 2010)

According Soediatama (1991) if the food source of animal protein has more than five kinds of essential amino acids and chemical values between 65-100 then food is a source of animal protein is of good quality, while the chemical sago value of 77.53 mg / g.

Sago adult beetles will lay their eggs in holes *Oryetes sp* hoist or on the shaft of the injured as deep as ± 3 mm. The eggs are laid scattered, amounted to ± 530 grains. Egg stage lasts ± 3 days. (Moniaga, 1980; Harsanto, 1990; Haryanto and Pangloli, 1992 in Purnamasari, 1997) Further development is grub (larvae) that lasts for 3-4 months. Sago beetle larvae are not cutting edge and no legs. Firm larger rear than the front. Gingery head, jointed body is very short. Mature larvae measuring 4-6 cm by 3 cm wide (Suhardiman in Purnamasari, 1997)

Phase larvae will turn into a chrysalis phase and this phase will last for ± 2 weeks. 6.5 cm long by 3.5 cm wide, then the beetles will emerge from the cocoon will stay ± 3 weeks in the trunk (Harsanto, 1990; Suhardiman, 1990 in Purnamasari, 1997)

Adult beetles (imago) trunk-shaped mouth piece, the difference straight snout beetles and hairy male while the female beetles somewhat bent down and bare. Adult beetles the size of 3-4 cm black. Active fly at night and sometimes spawn at night (Purnamasari, 1997).

II.2. Overview About HIV**II.2.1. History of HIV in Papua**

HIV cases in Papua have its own history. Was first discovered in Merauke in 1992. It is said that HIV was brought by the fishermen of Thailand and the commercial sex workers (PSK) which is in the south coast of Papua. Once found, the case of

HIV / AIDS is increasing from year to year and spread throughout Papua. In 2000, the number of people living with HIV reached 427 people. This number continues to increase until the year 2006, there were 2770 people are infected with this virus. In the same year also reported that Timika into place the spread of HIV / AIDS in Papua, as many as 1019 people, followed by as many as 834 people Merauke. The latest data shows that in the year 2010, people living with HIV in Papua have been increased to 3665 people, with the death toll reached 580 people. (Dwisetyowati.2013)

HIV / AIDS in Papua has a special character because it is associated with sexual behavior. Provincial Government in collaboration with the Department of Health and AIDS Eradication Commission as well as some Governmental Organization (NGO) working in the field of health has made utmost efforts to carry out campaigns, counseling and direct assistance to the community about this HIV.AIDS disease. But until now has not seen a concerted policy that shows the "political will" of the government to combat this disease. Cooperation Provincial Government and the Department of Health and NGOs in Papua appeared to have difficulty in inhibiting the spread of this disease, Abik because health services are not able to reach all corners of the region as well as supporting elements such as the development of risky sexual behavior; trafficking of sex workers, trafficking alcohol, drugs, entertainment industry night, and remain uncontrolled gambling industry effectively. Prevention of HIV / AIDS is still complicated by various economic interests should not be disturbed like; one of the sources of the spread of HIV / AIDS are in place for sex at outposts, where there is a collection of aloes wood as well as the complex sexual services to companies in the interior. Besides the stigmatization where communities have negative stereotypes of people living with HIV, even mendiskriminasinya discredit the person from public life. It makes people to refuse medical check for fear of contracting HIV / AIDS so discriminated by the society where he belongs. (Abednego., Hadi, M. 1998)

Some aspects that cause Timika into regional spread of HIV / AIDS due to various circumstances and external factors that occur. One of the situation and the external factors is the presence of PT. Freeport in Timika that menjadkannya "local money". Many migrants from other parts of Papua and outside Papua seek his fortune in Timika. Their presence would not only have a positive impact,

melaikan also negative impacts. The high HIV / AIDS can only be one result of this situation. The meeting between people who may not have known the background of health can accelerate the spread of this epidemic. This is consistent with the fact that the factor of transmission of HIV / AIDS in Papua is dominated by sexual intercourse. (Dwisetyowati. 2013)

The report of the Commission on HIV / AIDS (KPA) Papua Province disclose data per March 31, 2012 found as many as 12,187 cases of HIV / AIDS, with details as follows: number of 5,090 cases of HIV and 7097 AIDS cases. A total of 980 have died. Until the end of 2011, and of these about 20:21% of new HIV / AIDS patients who get antiretroviral treatment. Most sources of HIV transmission through heterosexual sex some 11 679 cases or 93.83%. The second risk factor is the transmission from mother to infant (perinatal) that as many as 222 cases, or about 1.82%. Another source of transmission such as blood transfusion, bisexual and homosexual and syringes to drug users is relatively small, ie below 0.1%. For transmission of male and female balanced. The number of males as much as 6,213 cases or 50.98% and women as much as 5862 cases or 48.10%. As for the spread of HIV cases more on the productive age of the age of 15-49 years, which is about 90.77% of all cases of unreported or as many as 11 062 cases. Most cases in the age group 25-49 years yani 7146 cases (58.64%). The second order of the age group 20-24 years as many as 2,740 cases (22:48%), followed by the age group 15-19 years ie 1176 cases (9.65%). (KPA Prop.Papua. 2012)

The cumulative number of cases of HIV and AIDS by Province by March 2014 according to a report from the Ministry of Health of the Republic of Indonesia, Papua Province ranks first with the highest number of HIV cases and AIDS cases 14 943 10 116 cases, followed by East Java, Jakarta, West Java and Bali. (MoH RI, 2014)

II.2.2. Prevention and Control of HIV / AIDS in Papua

There are some efforts that have been made in collaboration with the Provincial Government Department of Health, AIDS Eradication Commission and civil society organizations in the region, namely:

1. Prevention of sexual transmission

HIV (human immunodeficiency virus) is a retrovirus that infects cells of the human immune system, especially CD4 + T cells and macrophages vital component of the immune system "host" - and destroy or impair their function. HIV infection causes a rapid reduction of the immune system, leading to immune deficiency. HIV is the basic cause of AIDS. From the results of the study, all patients with HIV / AIDS who have entered into the phase of seropositive asymptomatic hypothyroidism.

2. Circumcision or circumcision

According to a study from Uganda reported in the open access journal mBio the April 16, 2013, the disposal of the foreskin in circumcision reduces the process of anaerobic bacteria, which enables the immune system to defend the sexually transmitted pathogens such as HIV. The study results are published in the American Society for Microbiology (ASM). (Liu, C. *et al.* 2013).

Half a decade ago large controlled studies began to show that adult male circumcision can reduce the risk of HIV transmission by half or more. Various protective mechanisms have been proposed, including a reduction in the overall amount of surface area that is vulnerable and makes the mucous membranes of the penis "stiffer" and less permeable to pathogens. (Avert, *et al.* 2005)

Liu of the *Translational Genomics Research Institute* and colleagues have found that the procedure of change "mikrobioma," or a collection of microorganisms that inhabit the head of the penis. Anaerobic bacteria are fewer leads to lack of inflammation, thus providing immune cells more vulnerable to HIV infection. The study, published on April 16 in mBio, open-access journal of the American Society for Microbiology, the researchers studied the effects of adult male circumcision on the type of bacteria that live under the foreskin before and after circumcision. At one year post-procedure, the total bacterial loads in the area have dropped significantly and the prevalence of anaerobic bacteria, which thrive in locations with limited oxygen, decreasing while the number of aerobic bacteria increased slightly. (Liu, C. *et al.* 2013)

Randomized controlled trials showed that circumcision reduced the risk of HIV infection in men by 50% -60% and reduce the risk of HPV infection and herpes simplex virus type 2, but the

biological reason behind this benefit is not well understood. It could be that the circumcised penis anatomy helps prevent infection, or it could be that a change in the protection mikrobioma, or some combination of the two. Using a swab samples from large trials of circumcision in Uganda, Price and colleagues at Johns Hopkins and TGen want to determine whether circumcision significantly alter the microbial communities in the penis. Using a technique called quantitative qPCR together with pyrosequencing to identify members of the public; the researchers compared samples of uncircumcised men with a sample of circumcised men were taken both before the procedure and at one year later. There is a dramatic and significant change in mikrobioma penis as a result of male circumcision. At first, the microbiotas of both groups of men are comparable. Years after the operation load of bacteria in all men declined somewhat, but in circumcised men were significantly greater decrease compared to the control group who were not. And almost all groups is a group of bacteria which reduced anaerobic or facultative anaerobes. Overall these changes reduce the diversity of microbiota.

Mikrobioma penis role in HIV transmission is unknown, but research suggests that bacteria can affect how susceptible penis against viral infection transmitted sexually. Among men who did not tersunat, high bacterial loads may activate the cells in the foreskin called Langerhans cells, preventing them from performing their normal role in fending off the virus. In contrast, Langerhans cells that actively betrayed the body, bind and deliver HIV particles to T cells, where they can start an infection. Reducing the number of bacteria in the penis can prevent Langerhans cell to become a 'traitor'.

According to Price, the study has implications beyond circumcision. Understanding changes mikrobioma after surgery could eventually lead to actions that do not require a surgical procedure. "The work we do, which could potentially reveal the underlying biological mechanisms, could reveal an alternative to circumcision that will have the same biological effect. If we find that the group of anaerobes that increase the risk of HIV infection, we can look for alternative ways to reduce this anaerobic, "and preventing HIV infection in all men who are sexually risky. (Liu, CM 2013)

3. Prevention of Transmission Through Blood

Prevention by ensuring that blood products used for transfusions are not contaminated with HIV virus, do not accept blood donations from people who are at high risk of contracting HIV / AIDS, using medical devices such as needles, razors, tools for piercing the puncture clean and sterile.

4. Main preventer of Mother-Child Transmission (Pre natal)

It is recommended that positive mothers infected with HIV / AIDS are advised to not become pregnant.

Aside from these activities there are several other ways of prevention that directly or indirectly help

prevent the transmission or prevention of HIV / AIDS. The activity in the form of communication activities, information and education in the form of implementation: AIDS counseling and kondomisasi efforts, aimed at families and the entire community of potential contracting HIV / AIDS.

II.3. Overview of the CD4

The term HIV has been used since 1986 (Coffin et al., 1986) as the name for the retrovirus that was first proposed as the cause of AIDS by Luc Montagnier of France, which was originally named LAV (lymphadenopathy-associated virus) (Barre-Sinoussi et al., 1983) and by Robert Gallo of the US, which was originally named HTLV-III (human T lymphotropic virus type III) (Popovic et al., 1984).

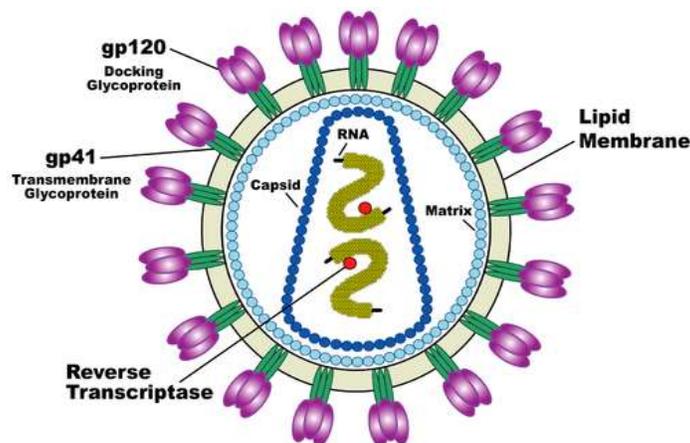


Figure 1.
Diagram HIV Virus

CD4 is a part of the white blood cells or lymphocytes. They are an important part of our immune system. These cells are also called T-4 cells, helper cells or CD4 + cells sometimes. In addition there is also a CD4 cell CD8 cells, also called T-8 cells or killer cells. CD8 cells that kill cancer cells or virus-infected cells. CD4 cells can be distinguished from CD8 cells by specific proteins on the cell surface. CD4 cells have the CD4 protein on their surface. Protein was working as a 'receptor' for HIV. HIV binds to the CD4 receptor like a key to the padlock. CD4 cells are a type of white blood cells that fight infection. Another name is the helper T-cells. CD4 cells are made in the spleen, lymph nodes

and thymus gland, which is part of the lymph system to fight infection. CD4 cell flow to all parts of the body, helping to identify and destroy germs such as bacteria and viruses. (www.Spiritia.com . 2009)

When HIV infects a human, infected cells most often are CD4 cells and HIV genetic code becomes part of the cell. Time CD4 cells multiply to fight an infection; they also make more copies of HIV. After our long HIV infection, CD4 cell count decreases. This is a sign that the immune system is being weakened. The lower the CD4 count the more likely we will get sick. (www.spiritia.com.2009)

a. CD4 blood test

This test is a standard test to assess prognosis progress to AIDS or death, to establish a differential diagnosis in symptomatic patients, and to take therapeutic decisions regarding antiretroviral therapy (ART) and prophylaxis for opportunistic pathogens. CD4 cells are the most reliable indicator of prognosis. The number of CD8 did not predict the development; HIV-specific CD8 cells (CD38 cells) are important for controlling HIV levels but can not be measured easily.

a. Technique

The standard method for determining the number of CD4 wear *flow cytometer* and hematology analysis tool wear EIA technology or by using *TRAX CD4 test kit* or by calculating TLC (*Total Lymphocyte count / TLC*).

b. The frequency of tests

CD4 test should be repeated every three to six months for patients who have not been treated with

HAART and a period of two to four months in patients taking antiretroviral therapy. The test should be repeated if the results are not consistent with the previous trend. Frequency will vary depending on individual circumstances. If untreated, the CD4 count will be decreased by an average of 4% per year for each log viral load .. If your test reports CD4 count = 34%, meaning that 34% lymphocytes were CD4. (www.spiritia.com.2009)

c. Factors affecting the amount of CD

CD4 count is calculated based on three variables: the number of white blood cells, lymphocytes percentage, and the percentage of CD4 cells (cells that carry the CD4 receptor).

d. CD4 percentages

Table 5 shows the percentage of absolute CD4 in blood.

Tabel 5. Percentage of absolute CD4 in mm³ blood

CD4 (Absolute)	CD4 (%) mm ³ blood
>500	>29%
200 – 500	14% - 28%
<200	<14%

(Sources : John G. Bartlett dan Joel E. Gallant, 2005)

II.4. The relationship between protein with CD4 (immune system) in the Body

HIV (Human Immunodeficiency Virus) is a virus belonging retrovirus RNA (Ribonucleit Acid). HIV attacks the human immune system that is not able to fight off viral and bacterial infections that should not cause disease in humans with a healthy immune system (<http://www.bcm.edu/molvir/hivaid>).

AIDS is the *late stage* of HIV infection, which the immune system of patients have suffered severe damage so that no longer able to fight other diseases such as cancer and other opportunistic infections. Clinical manifestations were found in patients with HIV / AIDS vary widely, depending on the degree of damage immunology and frequency of opportunistic infections in the environment. (Hadi. 2009)

Immunological damage in patients with HIV / AIDS can be characterized by looking at the patient's CD4 cell levels. CD4 is a marker or markers

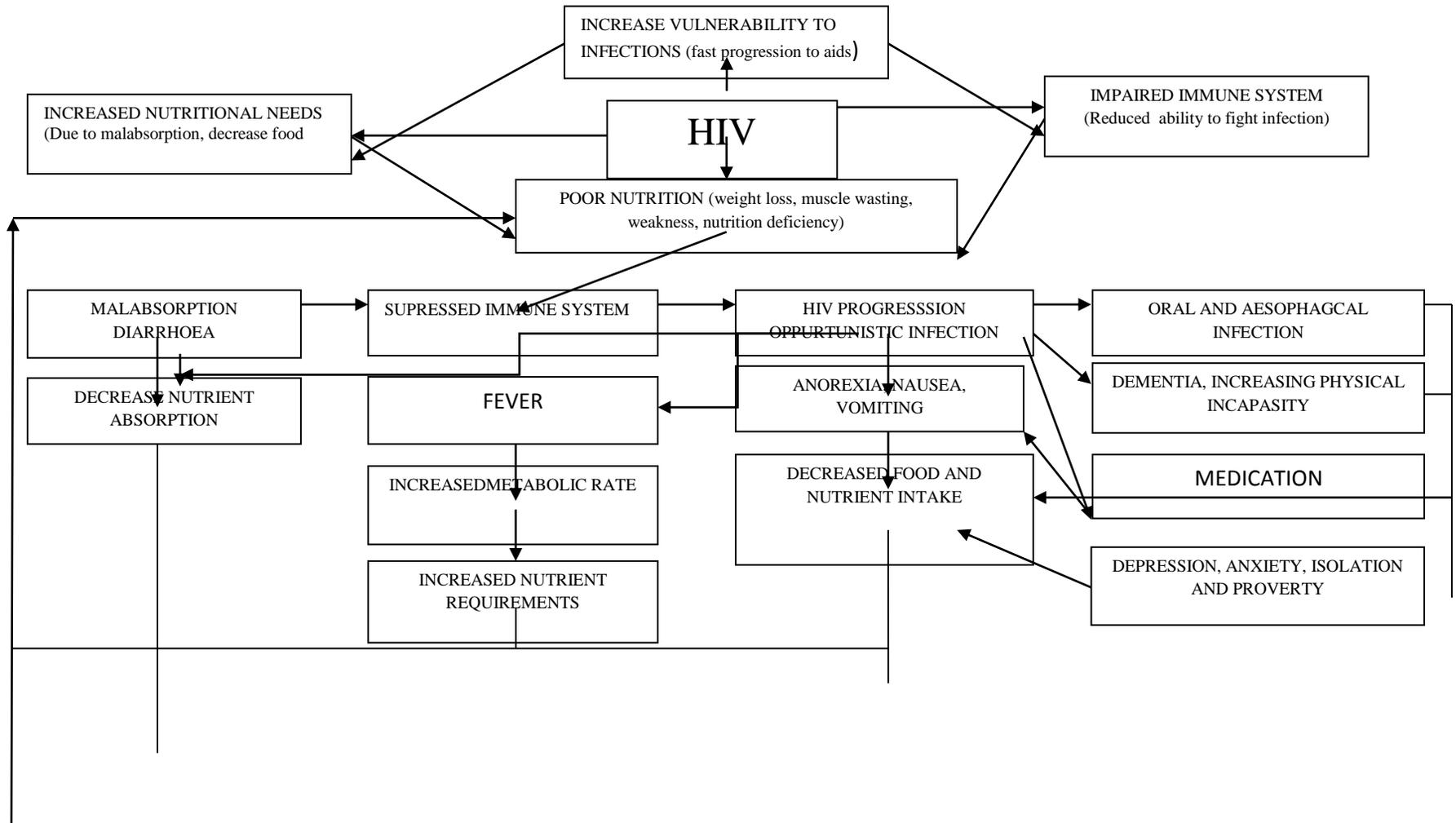
on the surface of human white blood cells, particularly lymphocytes. In people with a good immune system, CD4 levels ranging between 800-1500 cells / uL. In people with HIV / AIDS CD4 count decreases to less than 200 cells / mL, and then that happened opportunistic infections. (Hadi.2009)

Opportunistic infections that attack patients with AIDS one of which is an infection of Cytomegalovirus (CMV) and toxoplasmosis which attacks the nerves and eyes. The most common infection is an infection of the retina caused by a virus. (Poole, *et al* . 2007)

Information opportunistic infection is very important for society and patients with HIV / AIDS, given that the cause of death in AIDS is not due to HIV infection itself, but infections caused by a damaged immune system.

PICTURE 1.FRAMEWORK OF THEORY

(Vicious Cycle of HIV and Malnutrition. Crush,J, *et al.* 2011. Vicious Cycle of Nutrition, Disease and HIV. Crush,J, *et al.*2011)



II.5. Framework Theory

Optimal nutrition can help improve immune function and maximize the effectiveness of antiretroviral therapy and can improve the quality of life of people living with HIV are better. (Highleyman. 2006)

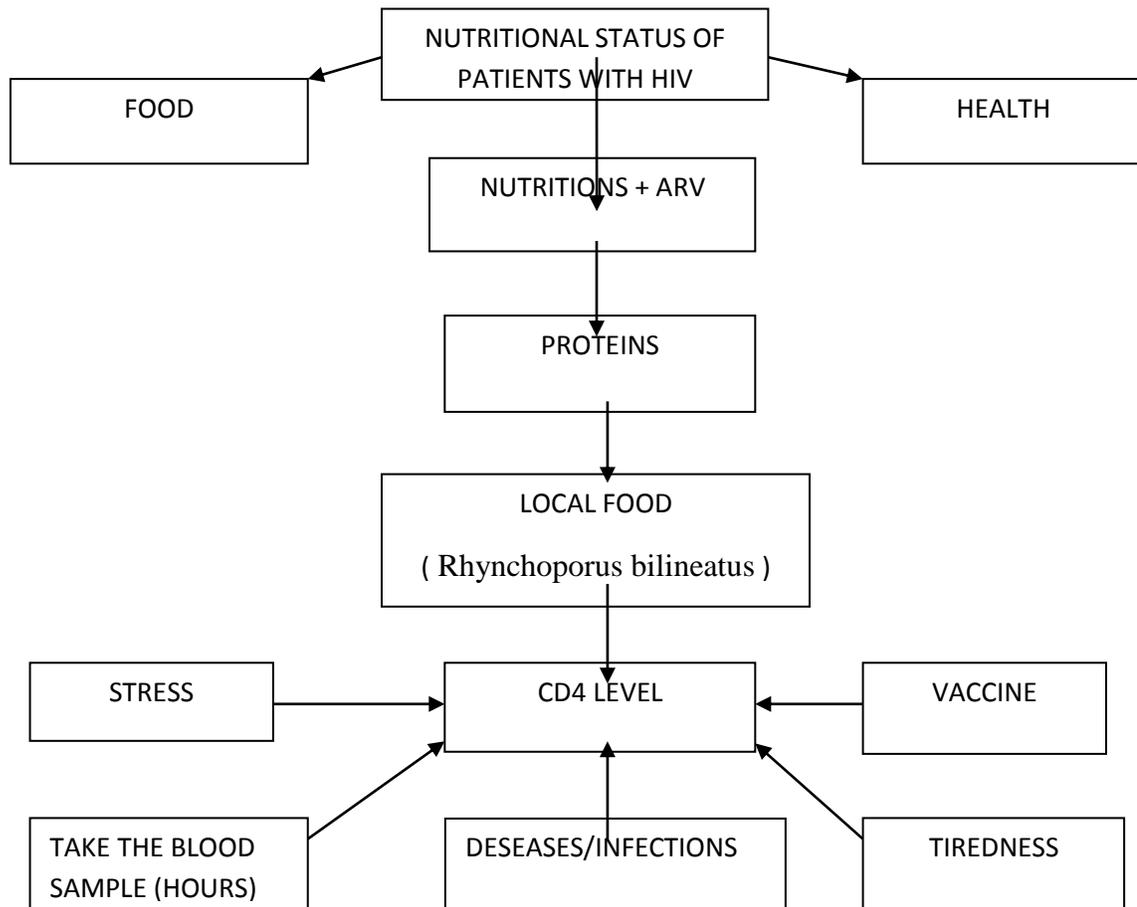
In the past, the food is viewed primarily as a means to help patients adhere to treatment to overcome the side effects of drug therapy Antiretroviral (ARV). But gradually it has become clear that in developing countries better nutrition plays a much more important role in improving the effectiveness of treatment of patients with HIV. (Lee, R. 2009)

In developing countries, there is a higher mortality rate for HIV patients receiving HAART than in rich countries. This is because people with HIV tend to seek treatment when they have HIV and are already undernourished and wasted from his

family. In this case, supplementary food aid increases the chances that treatment will work better and HIV patients will survive. That is why nutrition is now seen as an important complementary component of any effective treatment plan for helping people living with HIV to survive.

Proteins are part of the immune substances (antibodies) are very important for defending the body against infection (Kartasapoetra, 2005). Patients infected with HIV positive, protein breakdown occurs more rapidly in the body so that a low albumin concentration but by increasing the energy input of HIV-infected patients can improve the balance of protein (Jahor, *et al.* 2003).

Local food with high protein content and contains essential amino acids complete indispensable to increase the blood levels of CD4 in patients with HIV. Sago (*Rhynchoporus bilineatus*) is food and local communities in Papua are rich in protein and essential amino acids that are useful for growth.



Picture 2. Research Framework

III. RESEACH METHOD

1. Types Of Research

This research is a quasi-experimental design with a randomized control group pretest-posttest.

III.2. Location Research

Research will be conducted in Jayapura for one year, in cooperation with non-governmental organizations YPKM Papua who have shelter and have been actively engaged in assistance to people with HIV / AIDS in Papua Province. To determine levels of blood CD4 HIV patients will be performed at the Hospital VCT Abepura, Jayapura.

III.3. Research Subjects

A total of 24 people with HIV aged between 20-49 years who volunteered were included in this study. They live in a shelter which is managed by the NGO YPKM. Prior to participating in this study, all

subjects will be made to a medical examination to obtain preliminary data on the health condition of the subject and the data CD4 in the blood. Preliminary data are taken such as: weight, height, arm circumference (MUAC). Measurement of body weight subjects using digital scales (Seca, Hamburg Germany) with accuracy level of 0.1 kg in a standing position. Height measurement (TB) was performed using Microtoice (CMC weighing equipment, London UK) with accuracy level of 0.1 cm. Measurement of arm circumference (MUAC) was performed using a flexible plastic tape, non elastic with scale accuracy of 0.1 cm. As for the biochemical anthropometric examination conducted in the laboratory, include: complete blood count plus albumin, protein, globulin and total protein.

Inclusion criteria for study subjects are:

1. Had higher levels of CD4 > 200
2. Have good nutritional status
3. Willing to be quarantined for 2 months.

III.4. Identification Variables

- a. The independent variable is the provision of sago with 2 treatment that is; P1 (control) is the treatment group without supplementation sago, and P2 is the treatment group were given capsules sago.
- b. The dependent variable is the CD4 levels in blood samples taken after the subjects treated.

III.5. Variable Operational Definition

1. Caterpillar Sago palm is red beetle larvae aged 1, 5-2 months that have been through the process of extraction and packed in capsules ready to be given on the subject.
2. CD4 is a part of the white blood cells or lymphocytes which is an indicator of the progressive development of HIV infection. CD4 examinations conducted before and after the subjects were treated for 60 full days (one month).

III.6. Permit Research and Ethical Clearance

Requested at the Research Ethics Committee at the Faculty of Medicine, University of Hasanuddin.

III.7. Data Collection Technique

The steps are performed in collecting data is as follows:

1. Preparation of the product:
 - a. *Caterpillar election Sago*. Sago is used as a sample in this study is sago larvae aged 1, 5 to 2 months fresh. Pure white color and black mouth parts.
 - b. Proximate Analysis Extract Capsules Ingredients Silkworm Sago
 - b.1. Protein Content Test. (Method Kjedadahl) (Takeuchi, 1998)

1. Sample weighed weighing 0.5 - 1.0 grams and put into the flask Kjedadahl

2. Catalysts in the form of $K_2SO_4 \cdot 5H_2O$ with a ratio of 9: 1 weighed as much as 3 grams and was added to the flask Kjedadahl.

3. Then added 10 mL of concentrated H_2SO_4 into the flask and then the flask was heated for 3-4 hours until the liquid in the flask colored hjaau.

4. Then the solution was cooled, then added 30 ml of distilled water. Then insert the solution into a flask and diluted with distilled water until the solution reaches a volume of 100 ml (solution A).

5. 10 ml Erlenmeyer flask filled N H_2SO_4 0:05 and added 2-3 drops of indicator methylene blue or methyl red (solution B)

6. A solution taken as many as 5 ml and added 10 ml of 30% NaOH were put into the flask Kjedadahl. Then do the heating and condensation for 10 minutes starting when the first drop of the solution B.

7. The solution in the flask is titrated with 0:05 erlemenyer N NaOH solution until the color changes from pink to dark green.

$$A.1. \text{Protein concentration (\%)} = \frac{0.0007 * x (Vb - Vs)}{x Fx x 6:25 ** x 20 x 100\%}$$

Specification:

12:05 V_s = ml N NaOH for the sample nitran

V_b = ml 0:05 nitran N NaOH for the blank

F = factor correction than 0.05 N NaOH solution

S = weight of sample (g)

* = Per ml 0:05 N NaOH is equivalent to 0.0007 grams of nitrogen

** = Nitrogen factor

A.2. Fat Content Test (ether extraction method Sochlet) (Takeuchi.1988)

a. Extraction flask was heated at $110^{\circ}C$ for one hour, then cooled for 30 minutes in eksikator and weighed the weight of the flask (A).

b. Then put petroleum benzene as much as 150-250 ml in the reaction flask.

c. Materials weighed as much as 5 grams (a), inserted into the cartridge, then the cartridge is inserted into sochlet and ballast placed thereon.

d. Pumpkin extraction which have been associated with the above sochlet educate hotplate with water at a temperature of 100 °C allowed to stand until the liquid soaking the material in sochlet become clear.

e. After the solution was clear petroleum benzene, pumpkin ekstraksi released from the circuit and remains heated to evaporate all petroleum benzene evaporates.

f. Pumpkin and remaining fat is heated in the oven for 16-60 minutes di esikator and weighed (B).

$$\text{Fat Content (\%)} = \frac{B - A \times 100\%}{U}$$

A.3. WATER levels (Takeuchi, 1988)

1. Weigh X-gram sample, and enter into the cup
2. Insert the cup into the oven with a temperature of 110 °C for 2-3 hours
3. Chill the cup into esikator for 30 minutes, then weighed (Z)
4. Preheat the oven again with the same temperature for 1 - 1.5 hours
5. Refrigerate again the cup into esikator for 30 minutes, then weighed
6. Water Content (%) = $\frac{Z - Y \times 100\%}{X}$

A.4. Abu levels (Takeuchi.1988)

1. Porcelain cup is heated at a temperature of 600 °C for 1 hour using a muffle furnace, and then left until the temperature muffle furnace down to 110 °C, and porcelain bowls are removed and stored in esikator for 30 minutes and then weighed (A).

2. Heated porcelain cup (X) as the procedure no. 1, and then weighed.

3. 1-2 gram sample is weighed, and then put into Erlenmeyer, then added 0.3 N H₂SO₄ 50 ml, then heated again for 30 minutes.

4. The solution to the above number 3 in the filter, then washed successively with 50 ml of hot water, 50 ml of 0.3 N H₂SO₄ 50 ml, and 25 ml acetone.

5. Filter paper and its contents incorporated into porcelain cup, and then dried for one hour and cooled in esikator, subsequently weighed (Y), then dipijarkan, then cooled and then weighed (Z).

$$\text{Coarse fiber (\%)} = \frac{Y - Z - A \times 100\%}{X}$$

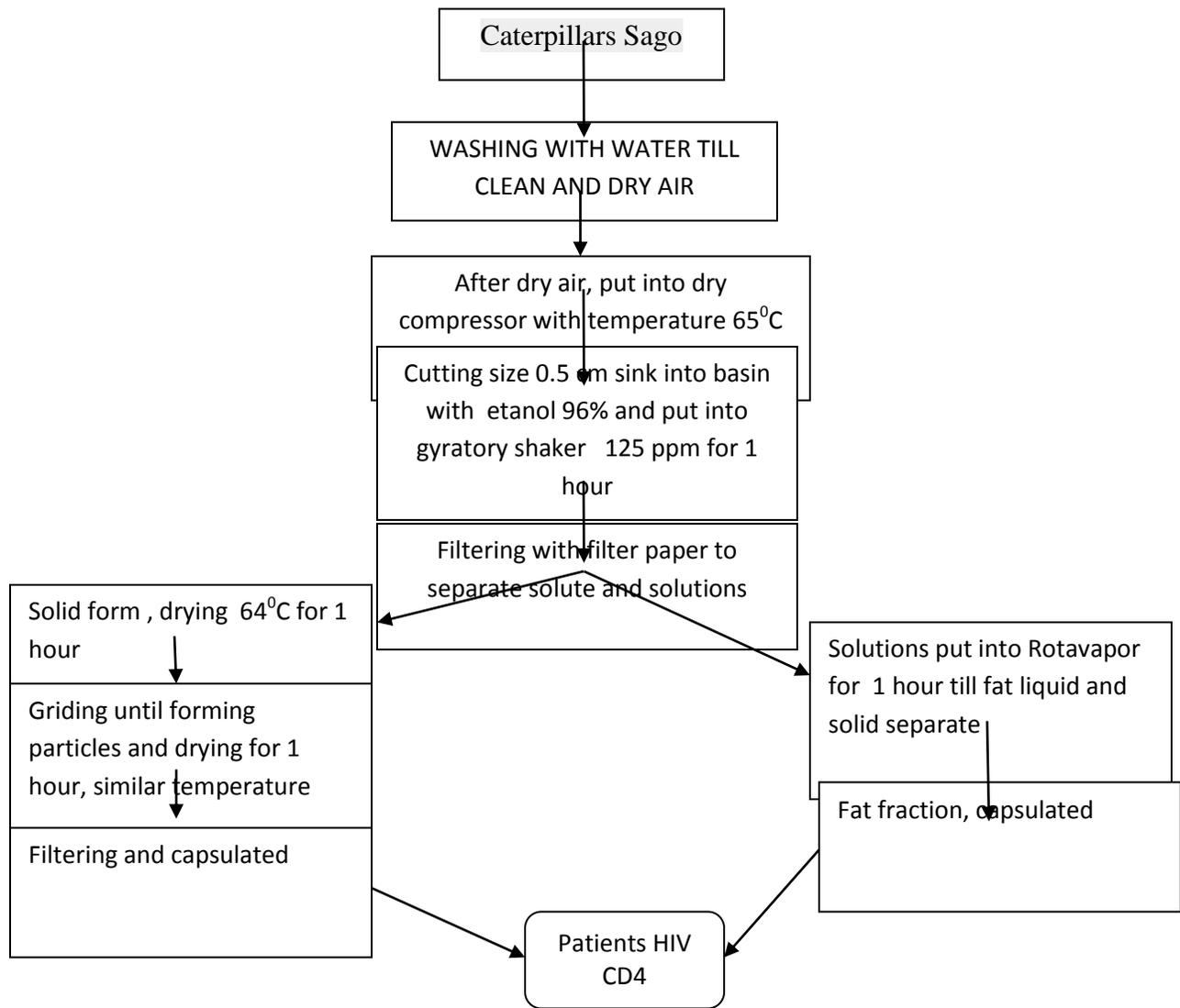
A.4. Capsule manufacture Caterpillars Sago

Proximate analysis is then performed for the capsule sago include: testing the content of carbohydrates, fats, proteins, minerals iron, Vitamin E, moisture content and ash to determine the composition of nutrients in it.

2. Treatment:

There are 24 subjects given a sequence number to be drawn or randomized treatment by P1 and P2. P1 is the control that HIV patients who receive ARVs but are not given a capsule sago, while P2 is the group treated. Each treatment consisted of 12 subjects. After that they gathered in one place, were interviewed and signed an informed content, retrieved the data initially and then given the same treatment good food, rest time and workload. Each research subject will receive treatment according to the draw for 2 full months. Each week physical anthropometric data such as bb, lilac, tb will be taken and monitored the development of the subject every week, while anthropometric data are complete examination of blood biochemistry, globulin, albumin and total protein and CD4 just taken before and after the study.

CAPSULE MANUFACTURE



CBC, globulin, albumin and total protein and blood CD4 levels in the subject will be carried out by methods already standardized for people with HIV in the Abepura Hospital VCT.

III.9. Data Processing and Analysis And Presentation of Results

Data were analyzed using analysis of variance (ANOVA) one significant way if the results will be followed by t test.

IV. Cover.

Because this study is a preliminary or basic research in new product trials food security for HIV-AIDS sufferers, the laboratory blood test results from all 24 patients with HIV-AIDS and protein levels papuanus *Rhynchophorus ferrugineus* var is still a long process leading to the publication later.

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