



ORIGINAL ARTICLE

Effect of Nutritional Supplement on the CD4 T-Lymphocyte Counts of Treatment Naïve Asymptomatic HIV Patients in Benin City, Nigeria

¹OKORIE, E.N. AND ²OPHORI, E.A

¹Department of Medical Microbiology, University of Benin Teaching Hospital, PMB1111, Benin City, Edo State, Nigeria

²Department of Microbiology, University of Benin, Ugbowo, Benin City, Edo State Nigeria

*Email: eaophori@yahoo.com

ABSTRACT

The effect of nutritional supplementation with haematinics and multivitamins on CD4⁺ T-lymphocyte counts of 30 diagnosed anti-retroviral therapy naïve asymptomatic human immunodeficiency virus (HIV) patients was investigated retrospectively from November 2005 to April 2006. Twenty-five sero-negative subjects were used as control. All the subjects were above the age of 18 years. The HIV patients were counseled on good nutrition and placed on haematinics and multivitamins three dose daily for six months. The CD4⁺ T-lymphocytes count of all subjects were determined at baseline, 3 and 6 months. Results showed that the CD4⁺ T-lymphocytes count of HIV subjects was not statistically different from that of control subjects throughout the study period ($P > 0.05$). Also, baseline, 3 and 6 months CD4⁺ T-lymphocytes values did not differ from each other significantly in both HIV patients and control ($P > 0.05$). Although the number of HIV subjects with CD4⁺ T-lymphocytes count of > 500 cells/ μ l reduced during the study period, none had a value of < 200 cells/ μ l. This study suggests that nutritional supplements may maintain the CD4⁺ T-lymphocytes levels for 6 months in HIV seropositive individuals, we recommend that appropriate timing of nutritional intervention be advocated and further encouraged.

Key words: CD4 count, HIV patients, nutritional supplement, asymptomatic

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INTRODUCTION

Infection with the human immunodeficiency virus (HIV) is a retrovirus that causes the acquired immunodeficiency syndrome (AIDS) in humans. It has been reported to have a devastating effect on the nutritional status of infected person [1]. Studies have shown that in the early period of HIV infection, weight gain or maintenance might be achieved through nutritional intervention [2,3]. Carefully chosen nutrient supplementation, especially micro-nutrients are important prophylactic and therapeutic measures for HIV-infected persons and is possibly one of the few potential therapies that could improve a patient's quality of life by maintaining strength, comfort, level of functioning and self image [2]. Nutritional supplementation has also been reported to significantly slow HIV disease progression, better preserve as well as increase CD4⁺ count, and reduced viral load [4,5,6]. The CD4⁺ count is used as a marker for immune status and HIV disease progression [2], HIV patients without symptoms of disease and with CD4⁺ count > 200 cells/ μ l are generally not placed on the highly active antiretroviral therapy (HAAR). Although therapy is delayed, monitoring of CD4⁺ level is recommended [6].

In the study area of Benin City Edo State Nigeria, asymptomatic HIV patients with high CD4⁺ count (> 200 cells/ μ l) are not placed on HAART. They are counseled on good nutrition and given haematinics with some vitamins. The effect of this on CD4⁺ count of asymptomatic HIV patients has not been assessed. Therefore, this study was aimed at investigating the effect of nutritional supplement on CD4⁺ count among ARV-naïve, asymptomatic HIV positive patients.

MATERIALS AND METHODS

Study Population

A total of 55 subjects consisting of 30 diagnosed asymptomatic HIV patients (subjects) and 25 age and sex matched HIV sero-negative subjects which served as controls were used for the study. The HIV patients were attending the HIV Clinics in University of Benin Teaching Hospital (UBTH) Benin City, Edo State, Nigeria were approached for participation in this study. To be eligible, they had to be 18 yr and above, ART naïve and willing to consume the supplement as directed. Exclusion criteria included individuals who have tuberculosis and or other serious opportunistic infections while the inclusion criteria included individuals whose CD4 was between 200 -500 cells/ul, individuals not on ARV therapy and women who were not pregnant. Verbal informed consent was obtained from each subject and the protocol for this study was approved by the Ethical Committee of the UBTH, Benin City. The study was conducted between November 2005 and April 2006.

Collection and Processing of Specimens

Five milliliters of venous blood was aseptically collected from each subject and dispensed into ethylene diamine tetra-acetic (EDTA) container and mixed thoroughly. The samples were analysed for CD4⁺ count using dynabead CD4⁺ T-lymphocyte quantification kit (Dyna, France) following the manufacturer's instruction. The CD4⁺ T-lymphocyte count was determined at the first visit of each patient as Baseline, 3 and 6 months after. All HIV patients were given daily doses of haematinics and multivitamins throughout the study period.

Statistical Analysis

The parametric data were analysed using student t-test and the non-parametric data were analysed using chi (X²) square test.

RESULT

The CD4⁺ count at baseline, 3 months and 6 months of HIV patients did not differ significantly ($P > 0.05$) from that of controls (Table 1). Also within HIV patients the mean CD4⁺ counts at baseline, 3 months and 6 months 632 ± 196 and 780 ± 956 respectively and was not statistically significantly ($P > 0.05$).

The number of HIV patients according to the various CD4⁺ count cut-off value is shown in table 2. There was a progressive decrease in the number of HIV patients with CD4⁺ count >500 cell/ μ l and a corresponding increase in the number of HIV patient with CD4⁺ count between 200-500 cells/ μ l. However, it was not statistically significant ($P = 0.532$).

Table 1: CD4⁺ counts of asymptomatic HIV subjects and sero-negative controls (cells/ μ l)

Duration	Mean CD4 ⁺ counts \pm SD in asymptomatic HIV patients (n = 30)	Mean CD4 ⁺ counts \pm SD in control (n = 25)	P – value
Baseline	632 \pm 178	691 \pm 218	0.217
3 months	621 \pm 196	699 \pm 209	0.116
6 months	780 \pm 956	708 \pm 212	0.715

Table 2: Number of HIV patients according various CD4⁺ counts cut-off values

Number of HIV patients with CD4 ⁺ counts (cells/ μ l)		
Duration	>500	between 200- 500
Baseline	21(70.00)	9 (30.00)
3 months	20 (66.67)	10 (33.33)
6 months	17 (56.67)	13 (43.33)

$X^2 = 1.26$, $P = 0.532$. Figures in parenthesis are in percentages, n =30.

DISCUSSION

Nutritional supplementation has been reported to enhance quality of life, increase CD4⁺ counts and reduce viral load of HIV-infected persons [2, 5]. In our environment, HIV patients with CD4⁺ count > 200 cells/ μ l are generally not placed on HAART, but are counseled on good nutrition and given haematinics and multivitamins, and their CD4⁺ count monitored. The result obtained showed that the CD4⁺ count did not differ significantly from that of control subjects at baseline ($P = 0.217$), 3 months ($P = 0.116$) and 6 months ($P = 715$), It is expected that as HIV replicates, there will be decrease in CD4⁺ count. However, this was not the case in this study. Table 1, nutritional supplementation has

been shown to decrease viral load [2] or increase it [3]. Therefore, as viral load is decreased, the rate of CD4⁺ depletion is reduced and the count may be maintained or increase. This may explain the result obtained in this study. It is important to note that oxidative stress stimulates HIV replication and addition of antioxidants inhibits HIV replication [8,9]. The HIV patients in this study were given multivitamins of which some (vitamin C and E), are known antioxidants and may explain the non-significant difference in CD4⁺ count between HIV patients and controls.

The findings in the study did not agree with some earlier report(1, 2) in which significantly lower CD4⁺ T-lymphocyte count were recorded, CD4⁺ T-lymphocyte count depends on the production of new CD4⁺ T cells and any impairment of production will not increase CD4⁺ count. The patient in the earlier study may have impaired CD4⁺ T-cells production. This is possible as the patient may already be severely immunocompromised because their CD4⁺ count ranges from 100-350 cells/ μ l[1,2] while that in this study ranged from 450-1012 cells/ μ l at baseline.

It was also observed that for controls and HIV patients, the CD4⁺ T-lymphocytes count did not differ significantly between baseline 3 months and 6 months, P = 0.217, P = 0.116 and P = 0.715 respectively. This confirms active production of new CD4⁺ T-lymphocytes.

Although the number of patients with high CD4⁺ count reduced, none had a CD4⁺ count < 200 cells/ μ l within the period of study. This implies that nutritional supplementation may maintain CD4⁺ count for 6 months as long as there is no production impairment. Therefore, the timing of the nutritional intervention is crucial as impaired CD4⁺ production cannot be remedied by nutritional supplementation. This is because nutritional supplementation only may inhibit HIV replication.

In conclusion, this study demonstrated that nutritional supplementation alone may maintain CD4⁺ T-lymphocyte level for 6 months. Appropriate timing of nutritional interventions is therefore advocated.

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REFERENCES

1. Oguntibeju, O.O., Vanden Heever, W.M.J., and Van Schalkwyk, F.E. (2008). Potential effect of nutrient supplement on the anthropometric profiles of HIV-positive patients: complementary medicine could have a role in the management of HIV/AIDS. *Afr. J. Biomed. Res.* **11**(1):13-22.
2. Oguntibeju, O.O., Vanden Heever, W.M.J., and Van Schalkwyk, F.E. (2006). Effect of a liquid nutritional supplement on viral load and haematological parameters in HIV positive AIDS patients. *Br. J. Biomed. Sci.* **66**(3):134-139.
3. Kaiser J.D, Campa AM, Ondercin JP, Leoung GS, Pless RF and Baum MK (2006). Micronutrient supplementation increases CD4 count in HIV infected individuals on HAAR therapy: a prospective, double blind, placebo-controlled trial. *J. AIDS*. **42**(5):523-528
4. Dworkin, B.M. (1994). Selenium deficiency in HIV infection and the acquired immunodeficiency syndrome (AIDS). *Chem. Biol. Interact.* **91**:181-186.
5. Fawzi, W.W., Mbise, R.L. and Hertzner, E. (1999). A randomized trial of vitamin A supplements in relation to mortality among human immunodeficiency virus-infected and uninfected children in Tanzania. *Pediatr. Infect. Dis.* **18**(2):127-133.
6. Fawzi, W.W., Msaraanga, G.I. and Spiegelman, D. (2004). A randomized trial of multivitamin supplement and HIV disease progression and mortality. *New Eng. J. Med.* **351**:23-32.
7. Patella, J.F.J. and Morman, A.C. (2002). Durability and predictors of success of highly active antiretroviral therapy for ambulatory HIV-infected patients. *AIDS* **16**:167-180.
8. Das, U.N., Podman, Sogar, P.S., G and Koratkar, R. (1990). Stimulation of free radical generation in human leucocytes by various agents including necrosis factor is a calmodulin-dependent process. *Biochem. Biophys. Res. Comm.* **67**:1030-1036.
9. Harakeh, S., Jariwalla, R.I. and Pauling, L. (1990). Suppression of human immunodeficiency virus replication by ascorbate in chronically infected cells. *Proc. Natl. Acad. Sci. USA.* **87**:7245-7249.

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