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## Efficacy Of The Cow Milk In The Increasing Of CD4 For People Living With HIV

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### **Abstract:**

*There are People Living with HIV (PLWHIV) who are poor. Those PLWHIV who are eligible to antiretroviral (ARV) drugs, get them free of charge, but their CD4 don't increase. The ARV, only, are not enough to increase CD4 for People Living with HIV. Meanwhile, the cow milk is a complete nutrient and it has several proteins which inhibit the enzymes of HIV. So the cow milk can increase rapidly CD4 for PLWHIV. On the other hand, there is a policy in Rwanda of "One cow per family" which has started. This policy aims at giving one cow to every family which is in need of it, in Rwanda. 1 liter of cow milk per day for 3 months was given to a study group of people living with HIV chosen randomly while a control group didn't receive the cow milk. There was a significant association statistically between consuming the cow milk and rapid increasing of CD4 with a threshold  $\alpha=0.05$ ,  $P=0.0012$ .*

**Key words:** Cow milk CD4

### **1. Introduction**

There is a major problem of People Living with HIV (PLWHIV) especially the poor ones, who don't have enough increasing of CD4 while they are on ART (Antiretroviral therapy). So ARV drugs only are not enough to increase CD4 for People Living with HIV.

Meanwhile, the cow milk which inhibits HIV enzymes by its 8 proteins such as lactoferrin, alpha lactalbumin, beta lactoglobulin, casein, glycolactin, angiogenin1, lactogenin, lactoperoxidase and is a complete nutrient with its water (90%), proteins (3-4g/100g), carbohydrates (4.8-5.2g/100g), fats (3.5-6g/100g), minerals like Potassium 138mg/100ml, calcium 125mg/100ml, Chlorine 103mg/100ml, Phosphorus 96mg/100ml, Sodium 50mg/100ml, Sulfur 30 mg/100ml, Magnesium 12 mg/100ml, micro minerals, including Cobalt, Copper, Iron 0.1 mg/100g, Manganese, Molybdenum, Zinc, Selenium, Iodine 22 mg/l; and vitamins like Vitamin A 39 $\mu$ g/100g, Vitamin B1 0.05mg/100g, Vitamin B12 0.17mg/100g, Vitamin C 0.6mg/100g, Vitamin D 0.03 $\mu$ g/100g, Vitamin E 0.07mg/100g, Vitamin PP-Pellagra Preventing Factor 0.16mg/100g, Vitamin B5 0.35mg/100g, Vitamin B9 3 $\mu$ g/100g, Vitamin K1 17 $\mu$ g/dl, Folic Acid 37.7 $\mu$ g/dl, Osmolarity 23mosm/dl; the cow milk has 750 kilocalories/liter. (7), (8), (9), (10), (11), (17), (18), (22), (25), (26), (28). On the other hand, there is in Rwanda a National Policy called: "One cow per family" which makes possible the availability of cow milk.

When I arrived at the MUNINI Hospital in October 2010, I found that 58% of all People Living with HIV on ART had less than 500 CD4 and 3 PLWHIV died in 2010, 4 died in 2011, according to Health Management Information System at the MUNINI Hospital of 2011, (HMIS 2011) and I remembered that I did in 2008 a study which showed the efficacy of the cow milk in the increasing of CD4 for people living with HIV and I decided to do the study in the NYARUGURU District, particularly at the MUNINI Hospital.

## 2. Materials and Methods

### 2.1. Materials

The fresh cow milk was purchased from local suppliers. That cow milk was boiled and given to participants in the study group. Facscount machine helped us to measure CD4 and Taqman system to have viral load. An electronic weighing scale helped us to measure the weight of participants and we used a height measuring stick for their height. A questionnaire was used for social, economic and demographic characteristics of the participants. The Stata/IC-11.0 was used for statistical analysis.

### 2.2. Study Type

This study is evaluative of an intervention. This means that there is an evaluation of an intervention which is about giving the cow milk to People Living with HIV. This intervention has an impact to the People Living with HIV especially in increasing their CD4.

### 2.3. Study Design

It is a randomized controlled trial. Participants were chosen randomly and they were in 2 groups. Those in the study group received 1 liter of cow milk per day for 3 months while participants in the control group didn't receive that cow milk.

### 2.4. Sample Design

The sampling design in this study is simple random sampling and any participants among all 24 enrolled in the study had the same chance to be selected.

### 2.5. Period Of The Study

The study started on August 09, 2012 and ended on November 14, 2012.

### 2.6. Method Itself

Based on a randomized controlled trial and simple random sample design, among a group of 24 People Living with HIV with similar socio-economic and clinical characteristics, two groups of 12 People Living with HIV each were randomly allocated, one to receive the cow milk as a study group and the other to not receive the cow milk as a control group.

In the study group there were 12 adults living with HIV, indigents, treated with ART since at least 6 months with CD4 count below  $500/\text{mm}^3$ . All were living in the NYARUGURU District in Rwanda and used to consult the ART department at the MUNINI Hospital. They didn't have any allergy and/or intolerance on the cow's milk and they accepted to consume the cow milk.

In the control group, there were 12 adults Living with HIV, indigents, treated with ART since at least 6 months with CD4 count below  $500/\text{mm}^3$ . All were living in the NYARUGURU District in Rwanda and, like participants in the study group; they used to consult the ART department at the MUNINI Hospital. Some of them had allergy and/or intolerance on the cow's milk. Others told us that they didn't like to drink it. Finally, others could drink it but they could not afford to buy one liter a day for three months because of poverty. One liter of the cow milk had a price of about \$0.56. Participants were indigents and they could not afford to pay themselves such amount of money.

We managed to measure CD4, Viral load and weight as well as body mass index for all participants both in the study group and in the control group at the beginning and the end of the study.

## 3. Results

In the study group we had twelve people living with HIV and three of them equivalent to twenty- five percent had beyond  $500 \text{ CD4}/\text{mm}^3$ , seven of them equivalent to fifty-eight percent had from  $350$  up to  $500 \text{ CD4}/\text{mm}^3$  and two participants equivalent to seventeen percent had between  $200$  and  $349 \text{ CD4}/\text{mm}^3$ . No one had less than  $200 \text{ CD4}/\text{mm}^3$  at the end of the study.

In the control group we had twelve people living with HIV. No one had beyond  $500 \text{ CD4}/\text{mm}^3$ . Three participants who were equivalent to twenty-five percent had from  $350 \text{ CD4}/\text{mm}^3$  up to  $500 \text{ CD4}/\text{mm}^3$ ; eight participants who were equivalent to sixty-seven percent had from  $200 \text{ CD4}/\text{mm}^3$  up to  $349 \text{ CD4}/\text{mm}^3$  and one participant in the control group who was equivalent to eight percent had less than  $200 \text{ CD4}/\text{mm}^3$ .

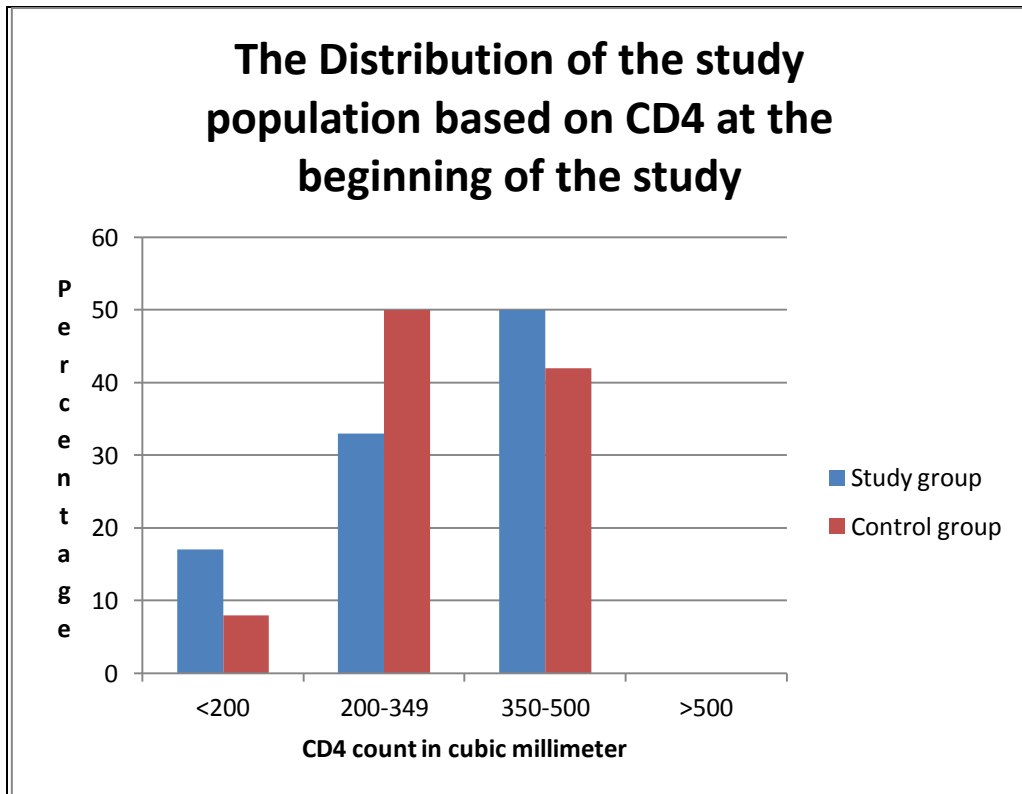


Figure 1

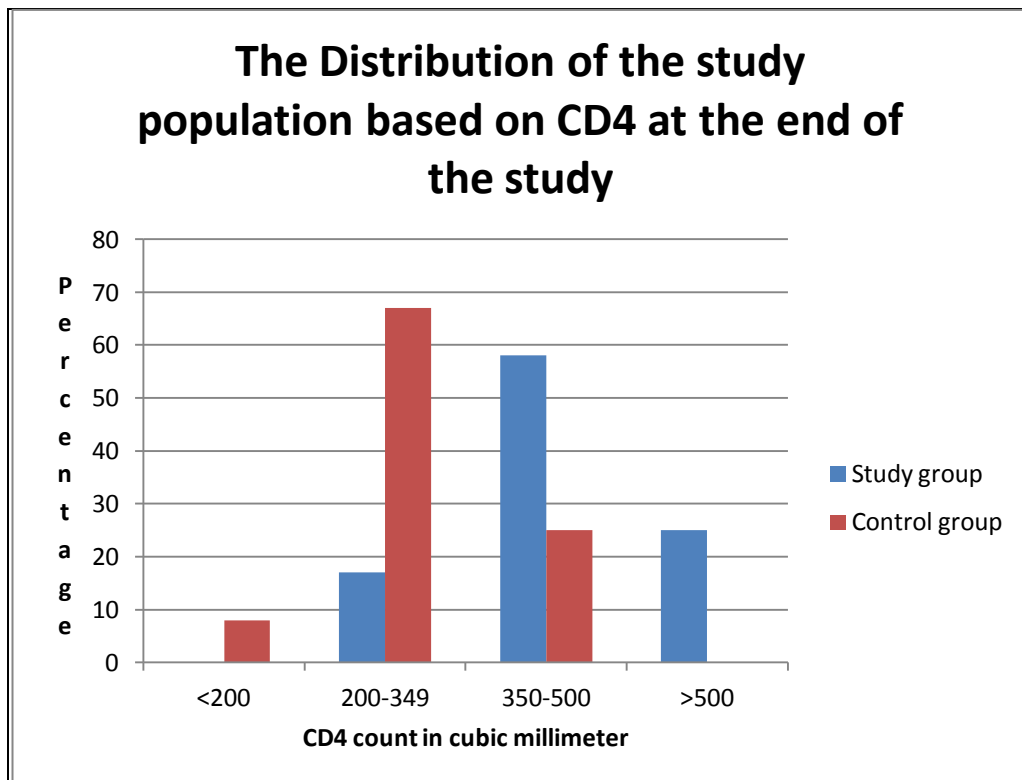


Figure 2

```
. ttest cd4i, by(group)
Two-sample t test with equal variances
```

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
1	12	331.4167	32.91989	114.0378	258.9605	403.8729
2	12	329.3333	31.62142	109.5398	259.7351	398.9316
combined	24	330.375	22.3228	109.3589	284.1968	376.5532
diff		2.083333	45.64683		-92.5824	96.74907

```
diff = mean(1) - mean(2)          t = 0.0456
Ho: diff = 0                      degrees of freedom = 22
Ha: diff < 0                      Ha: diff != 0          Ha: diff > 0
Pr(T < t) = 0.5180                Pr(|T| > |t|) = 0.9640    Pr(T > t) = 0.4820
```

Table 1: Value Of Mean, Standard Deviation And P Relating To The CD4 Count By Groups At The Beginning Of The Study

```
. by group, sort : ttest cd4i == cd4ii
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```
-> group = 1
Paired t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cd4i	12	331.4167	32.91989	114.0378	258.9605	403.8729
cd4ii	12	451.4167	30.73382	106.4651	383.772	519.0613
diff	12	-120	27.83474	96.42237	-181.2638	-58.73615

```
mean(diff) = mean(cd4i - cd4ii)          t = -4.3112
Ho: mean(diff) = 0                      degrees of freedom = 11
Ha: mean(diff) < 0                      Ha: mean(diff) != 0          Ha: mean(diff) > 0
Pr(T < t) = 0.0006                      Pr(|T| > |t|) = 0.0012    Pr(T > t) = 0.9994
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```
-> group = 2
Paired t test
```

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
cd4i	12	329.3333	31.62142	109.5398	259.7351	398.9316
cd4ii	12	300.0833	29.19565	101.1367	235.8242	364.3425
diff	12	29.25	15.3357	53.12443	-4.503649	63.00365

```
mean(diff) = mean(cd4i - cd4ii)          t = 1.9073
Ho: mean(diff) = 0                      degrees of freedom = 11
Ha: mean(diff) < 0                      Ha: mean(diff) != 0          Ha: mean(diff) > 0
Pr(T < t) = 0.9585                      Pr(|T| > |t|) = 0.0829    Pr(T > t) = 0.0415
```

Table 2: Value Of Mean, Standard Deviation And P Relating To CD4 By Groups At The End Of The Study  
( $P < 0.05$  For The Study Group)

#### 4. Discussion

The people living with HIV, in the study group, who consumed one liter of cow milk per day for three months had an increasing of CD4 of about one hundred and twenty CD4 per cubic millimeter ( $120 \text{ CD4/mm}^3$ ) on average within only three months, while the people living with HIV in the control group, who didn't consume the cow milk within three months, leaving in similar socio-demographic conditions with similar characteristics like the participants in the study group, had a decreasing of CD4 of about twenty-nine CD4 per cubic millimeter ( $29 \text{ CD4/mm}^3$ ) within three months.

The results showed that there was a significant association statistically between consuming the cow milk and rapid increasing of CD4 with a threshold  $\alpha=0.05$ ,  $P=0.0012$

A laboratory limitation in measuring the viral load below 20RNA copies/ml characterized the results.

The results showed that there was a significant association statistically between consuming cow milk and rapid increasing of the weight with a threshold  $\alpha=0.05$ ,  $P=0.0000$

The results showed that there was a significant association statistically between consuming the cow milk and rapid increasing of body mass index with a threshold  $\alpha=0.05$ ,  $P=0.0001$

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