



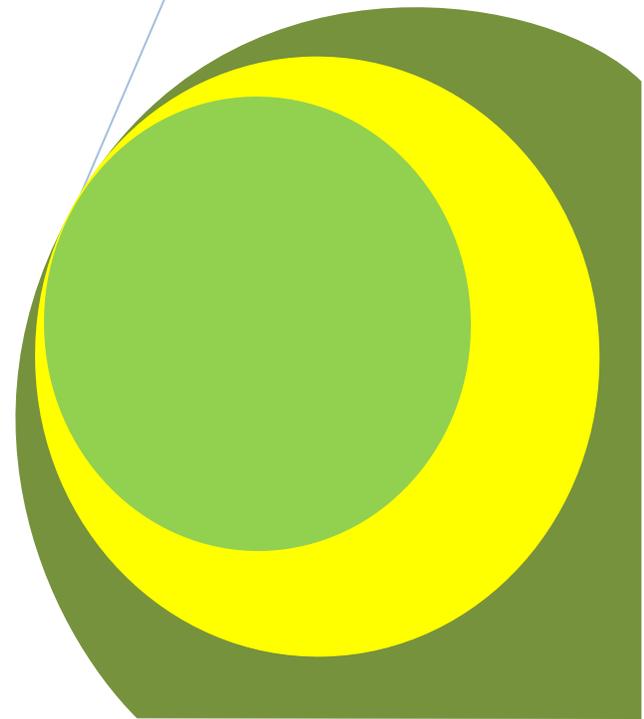
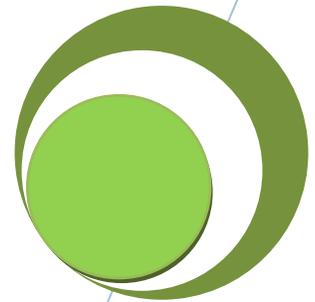
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CD4 Cell Count of HIV- Positive Patients in Awka, South East Nigeria

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Research Article

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ABSTRACT

CD4 cell count (CD4 count) is pivotal in determining when to initiate antiretroviral therapy and in staging of human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS). It gives information on possible treatment failure. This study was undertaken to evaluate the CD4 count of treatment naïve HIV-positive patients who registered at HIV clinic of Anambra State University Teaching Hospital Awka, Anambra State. 460 case notes of all confirmed, HIV-positive patients who enrolled at the HIV clinic of Anambra State University Teaching Hospital Awka between Jan 2011-June 2013 were retrieved from the medical records. Baseline CD4 count, sex, age, ethnicity, occupation and religion were recorded and reviewed. 143 patients (31.09%) were males, while 317 (68.91%) were females with male to female ratio being 1:2.2. 39.13% were between 21-30 age range, closely followed by 31-40 age range with 33.48%. Only one patient (0.22%) belonged to above 70 age group. The occupation of most patients was business/trade which had 165 patients (35.87%). 22.61% were self-employed. The least was professional with 15 patients (3.26%). Those with CD4 count of less than 350 cells/mm³ were 240 (52.17%) while 220 (47.83%) had above 350 cells/mm³. 119 patients (25.9%) had CD4 count of 200 cells/mm³ or less. Based on current guidelines, most HIV positive patients in this study require antiretroviral therapy.

Keywords: HIV/AIDS, CD4 count, patients, Nigeria.

INTRODUCTION

CD4 (cluster of differentiation 4) refers to a glycoprotein found on the surface of immune cells such as T helper cells, monocytes, macrophages and dendritic cells. In humans, the CD4 protein is encoded by the CD4 gene (Isobe et al., 1986; Ansari- Lari et al., 1996). T lymphocytes are divided into

- 1) Helper T cells which help in the functions of the immune system.
- 2) Cytotoxic T cells also called killer cells which kill infected cells (Kumar, 2012).
- 3) Suppressor T cells which are capable of suppressing the function of both cytotoxic and helper T cells.

Human immunodeficiency virus (HIV) causes acquired immunodeficiency syndrome (AIDS) by destroying CD4+ T cells (Alimonti et al., 2003).

CD4 count, therefore, measures the degree of immunosuppression in HIV-positive patients. There is an inverse relation between CD4 count and degree of immunosuppression (Akinbami et al., 2012). The reference standards used to monitor HIV infection are flow cytometric analysis of T lymphocyte subsets to provide the CD4 T cell count and molecular assays to quantify plasma HIV load. Few laboratories in resource- constrained countries can afford to perform these tests (Crowe et al., 2003). Here in Nigeria, CD4 count is routinely done. It plays an important role in deciding when to commence therapy, staging the disease, monitoring disease progression and determining treatment failure. Generally, CD4 count takes priority over viral load if both tests cannot be carried out together because of financial constraints (Crowe et al., 2003). The cost of CD4 count is lower than viral load. It is increasingly becoming more affordable to patients in developing countries (Mellors et al., 1997; Lutwana et al., 2008).

CD4 counts are usually expressed as the number of cells per microliter (or cubic millimeter, mm³) of blood, with normal values for CD4 cells being 500-1200 cells/mm³ (Bofill et al., 1992). Oladepo et al., (2009) established in healthy Nigerian adults a reference value for CD4 of 365 to 1,571 cells/ μ L. Less than 200 cells per microliter in an HIV-positive individual is diagnosed as AIDS. The depletion of CD 4 + T helper lymphocytes weakens the immune

system and allows opportunistic infections. The mechanism of CD4+ T cell depletion differs in acute and chronic phases (Hel et al., 2006).

According to joint United Nations Programme on HIV&AIDS (UNAIDS), 34 million people are living with HIV in the world. Of these, approximately 23.5 million are in sub-Saharan Africa. Nigeria is second in Africa with 3 million people while South Africa is first with 5.6 million people. Globally, 14.8 million people are eligible for HIV treatment, while 8 million are on antiretroviral therapy (UNAIDS, 2012). As at 2011, HIV/AIDS resulted in about 1.7 million deaths and 2.5 million new infections (UNAIDS, 2012).

HIV/AIDS is diagnosed via laboratory testing and then staged based on the presence of certain signs or symptoms (WHO, 2007). In developing countries, the World Health Organization's (WHO) staging system is primarily used while in developed countries, the Centers for Disease Control and Prevention (CDC) classification system is more frequently used. The WHO staging is based on clinical findings and does not require CD4 count in order to accommodate for resource-constrained settings where CD4 count testing may not be available.

However, the CDC's staging system uses CD4 count as a tool to stage HIV. In this system, which was updated in 2008, HIV infections are classified based on CD4 count and clinical symptoms (Schneider et al., 2008). Stage 1: CD4 count ≥ 500 cells/ μL . Stage 2: CD4 count 200-500 cells/ μL . Stage 3: CD4 count ≤ 200 cells/ μL . It defines AIDS as all HIV-positive patients with CD4 count < 200 cells/ μL or CD4 % $< 14\%$.

This study was carried out to evaluate the CD4 count on initial presentation of treatment naïve HIV-positive patients attending the HIV clinic of the Anambra State University Teaching Hospital, Awka between January 2011 and June 2013.

MATERIALS AND METHODS

The case notes of all treatment-naïve, confirmed HIV-positive patients who enrolled at the HIV clinic of Anambra State University Teaching Hospital, Awka between Jan 2011-June 2013 were retrieved from the medical records. Infants and children without CD4 count, those with incomplete records were excluded. Socio-demographic variables such as age, gender, occupation, ethnicity and CD4 count on initial hospital visit were recorded. Data source was authentic and reliable. Ethical clearance for this study was obtained from the Ethics Committee of the Faculty of Basic Medical Sciences of Anambra State University, Uli Campus.

Percentages of relevant data were calculated and presented in simple descriptive statistics.

RESULTS

The data obtained showed that a total of 460 case notes had complete documentation and met the requirement for the study. 143 (31.09%) of these were males, 317 (68.91%) were females, thus giving a male to female ratio of 1:2.2.

5.44% were in the 20 & less age range. 39.13% belonged to 21-30 age range. 33.48% were in the 31-40 age range. 15.65% were in the 41-50 age range. 5.0% were in the 51-60 age range. 61-70 age range had five patients (1.08%). Only one person (0.22%) was above 70 years of age.

In terms of occupation, 40 patients (8.70%) were civil servants. 3.26% were professionals. 35.87% were businessmen/traders. 12.17% were students. 22.61% were self-employed. Lastly, 17.39% were unemployed.

48 patients (10.44%) had CD4 count of 50 cells/ μL & less, while 15.44% had between 51-200 cells/ μL . 35.44% recorded CD4 count of between 201-400 cells/ μL . Those who had between 401-600 cells/ mm^3 were 96 in number (20.87%). 9.35% had between 601-800 cells/ mm^3 . lastly, 39 patients (8.46%) had CD4 count of above 800 cells/ mm^3 .

240 (52.17%) patients had CD4 count of less than 350 cells/ mm^3 , while 220 (47.83%) had above 350 cells/ mm^3 .

Table: Socio-demographic characteristics

Group Age (Years)	Number	Percentage (%)
20 & Less	25	5.44
21-30	180	39.13
31-40	154	33.48
41-50	72	15.65
51-60	23	5.00

61-70	5	1.08
>70	1	0.22
Gender		
Male	143	31.09
Female	317	68.91
Occupation		
Civil servant	40	8.70
Professional	15	3.26
Business/trading	165	35.87
Student	56	12.17
Self-employed	104	22.61
unemployed	80	17.39
Ethnicity		
Igbo	426	92.61
Hausa	9	1.96
Yoruba	2	0.44
Others	23	4.99

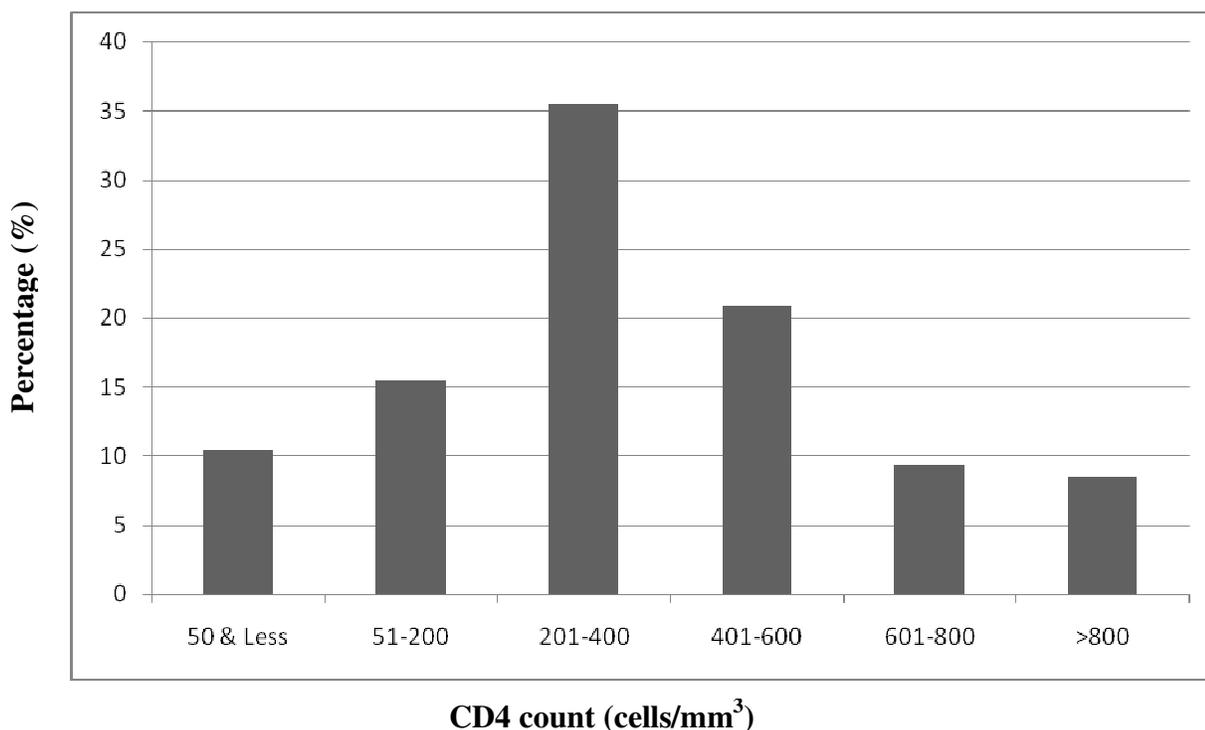


Fig: CD4 count of patients

DISCUSSION

WHO recommends antiretroviral therapy in all adolescents, adults and pregnant women with a CD4 count less than 350 cells/ μ L or those with symptoms regardless of CD4 count (Vogel et al., 2010; WHO, 2010). Based on this, high proportion of our patients (52.17%) would require to be placed on antiretroviral therapy having CD4 count of less than 350 cells/ μ L. Beginning treatment at this level reduces the risk of death (Siegfried et al., 2010). Other benefits of treatment include a decreased risk of progression to AIDS (Sterne et al., 2009); improves physical and mental health (Beard et al., 2009), a decreased risk of transmission of the disease to sexual partners and a decrease in mother-to-child transmission (WHO, 2010). However, it is pertinent to note that those with severe and advanced clinical disease (WHO clinical stage 3 and 4) should start ART irrespective of their CD4 cell count.

In this study, 220(47.83%) had CD4 cell count of above 350 cells/mm³. 201-400 cells/mm³ range was 35.44%. 401-600 cells/mm³ range was 20.87%. 601-800 cells/mm³ range was 9.35%. Above 800 cells/mm³ was 8.46%. Thus, the higher the CD4 cell count the lower the number. There seems to be consensus of opinion on deferral of ART in asymptomatic HIV patients whose CD4 count is greater than 500 cells/mm³. These patients would need counseling and follow-up.

Following wide use of potent antiretroviral regimens, the incidence of most previously common opportunistic infections and even cancers has substantially declined and mortality has fallen commensurably. Infections previously incurable, requiring lifelong maintenance treatment no longer require therapy once antiretroviral effects are established (Volderbing, 2003). The number of people dying from AIDS-related causes began to decline in the mid-2000s because of scaled up access to antiretroviral therapy and the steady decline in HIV incidence since the peak of the epidemic in 1997 (UNAIDS, 2012).

The female: male ratio in the present study is similar but slightly higher than 1.6:1 of Akinbami et al., (2012), 1.8:1 of Omoti et al., (2007). However, it is in contrast with 1:1.2 of Oguejiofor et al., (2008). Glynn et al., (2001) reported HIV prevalence was six times higher in women than in men amongst sexually active 15-19 years old, but it dropped to three times in men among 20-24 years old and equal that of men among 25-49 years old. Thus, disparity in gender prevalence is age-dependent. The present study reviewed only those that enrolled at HIV clinic and, therefore, did not investigate between males and females who are more predisposed to contracting HIV/AIDS. Women are more likely to be higher in number because of the added need to go for antenatal visits where HIV screening is also done. However, females are more predisposed to contracting HIV because of early marriage, polygamous relationships and pelvic inflammatory disease and genital ulcers (Dosekun and Fox, 2010; Boily et al., 2009; Asekun-Olarinmoye et al., 20011).

Culturally, the majority of males in this part of the world are circumcised. Circumcision in sub-Saharan Africa reduces the risk of HIV infection in heterosexual men by between 38% and 66% over two years (Siegfried et al., 2009). Based on this and other studies, WHO and UNAIDS both recommended male circumcision as a method of preventing female-to-male HIV transmission in 2007 (WHO, 2007).

The higher percentage recorded between the ages of 21-30 and 31-40 can be attributed to the fact that these age groups are sexually active and are prone to unprotected sexual intercourse, drug abuse and acts associated with youthful exuberance.

The 61-70 and above 70 age brackets had the lowest number of patients: 5 (1.08%) and 1 (0.22%) respectively. HIV/AIDS is associated with decrease in life expectancy. If treatment is begun following the diagnosis of AIDS, life expectancy is approximately 10-40 years (Vogel, 2010, Knoll et al., 2007).

The number of patients with CD4 count \leq 200 cells/ μ L was 119 (25.9%). Based on CDC staging system, they can be said to have AIDS. After the diagnosis of AIDS, if treatment is not available, survival ranges between 6 and 19 months (Morgan et al., 2002; Zwahlen and Egger, 2006). The primary causes of death from HIV/AIDS are opportunistic infections and cancer both of which are frequently the result of the progressive failure of the immune system (Cheung et al., 2005).

This present study is primarily centered on a hospital based data. This appears to be a limitation. The CD4 ranges would undoubtedly change if all HIV-positive patients in communities making-up Awka town were investigated and analyzed. It is well recognized that many HIV-positive people are unaware that they are infected with the virus. The data we used in this study reflected the number of people that willingly visited the teaching hospital in Awka. Voluntary counseling and testing (VCT), therefore, is an important measure in increasing access to diagnosis and treatment. In addition, early diagnosis will help capture patients with higher CD4 counts thereby improving prognosis.

CONCLUSION

Investigating the pattern of CD4 distribution in treatment-naïve HIV positive patients has strong implication for management. There is widespread agreement that symptomatic HIV patients and patients with AIDS require antiretroviral therapy. The decision to initiate antiretroviral therapy is based on the degree of immunosuppression and the risk of disease progression, as indicated by the CD4 count and the plasma viral load. Very few centers in developing countries can afford both tests. CD4 count being cheaper is more readily available. In most of the developing countries, CD4 count is an important criterion for initiation of treatment. The Nigerian governments (both federal and state) should endeavor to sustain and even improve on the current public enlightenment campaign on HIV/AIDS. Antiretroviral drugs should be made available to HIV positive patients especially in the rural areas.

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