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Haematological Profile of Human Immunodeficient (HIV) Seropositive Patients on Antiretroviral (ARV) Therapy: Implication of Nutrition

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Abstract: This study investigated the haematological profile of HIV seropositive patients on antiretroviral therapy who were placed on diets enriched green leafy vegetables. Eighty patients/subjects-male and females who met our inclusion criteria were selected into into three study groups-Control (group 1), group 2 (HIV + positive patients not on ARVs) and group 3 (HIV + patients on ARVs). All the HIV infected subjects were attending the HIV/AIDS clinics at the University of Nigeria Teaching Hospital, Enugu while apparently healthy individuals who were HIV seronegative constituted the control. Five milititers of venous blood collected from each subject under asceptic conditions into EDTA bottles was used to determine platelet count, erythrocyte sedimentation rate and packed cell volume. The second line regimens of ARVs were administered to all subjects in group 3 after their HIV serostatus were confirmed while group 2 were not given ARVs. All subjected were advised to fortify their diets with green leafy vegetables. The mean platelet count in group 3 was 556±153.9(SD) 10^9 / L; ESR = 92.15±10.31(SD) per mm h; PCV = 29.10±3.10(SD) %. For the group 2, platelet count was 81.5±31.26(SD)10^9/L; ESR = 95.9±25.2(SD); PCV = 24.81±2.10(SD) %. Control had platelet count of 251.4±64.97(SD) 10^9/L; ESR = 14.29±6.37(SD) per mm h; PCV = 41.0±4.57(SD)%. Antiretroviral therapy and nutrition increased platelet counts than ESR and PCV in HIV+ patients on antiretroviral therapy.

Key words: HIV seropositive patients, HIV seronegative patients, green leafy vegetables, Packed Cell Volume (PCV), Erythrocyte Sedimentation Rate (ESR), platelet count, nutrition

INTRODUCTION

Previous studies claimed that Antiretrovirals (ARVs) are dangerous and actually worsen the immune status of HIV positive individuals (Barry *et al*., 1994; Peechere *et al*., 1993; Collman and Weiner, 1992; Davis and Zauli, 1995; Candido, 1990). There is also flow of the so-called 'miracle cures' in the form of immune boosters, multivitamins, traditional herbs, African potatoes, garlic, ginger, jobelyn which are much cheaper than ARVs aided HIV infections (Ogunbanjo, 2005; Ayuba and Erah, 2004; Seune-Fosso *et al*., 2004). However, HIV is non-reversible and that ARVs will become a necessity as the CD4+ counts drop below the 200 cells/mls mass. Vegetables have been shown to provide not only nutritional but medicinal effects (Brander and Pugh, 1982). Also, vegetables constituted significantly to the improvement of human health (Seune-Fosso, 2007) and enhance disease prevention (Oke, 1993) and therapy (Breazile, 1971; Burkill, 1985). Against this background that proper nutrition and supplements aid HIV patients (FAO, 2007; Seune-Fosso, 2007), this present study investigated platelet counts, Erythrocyte Sedimentation Rate (ESR) and Packed Cell Volume (PCV) in HIV seropositive patients undergoing ARVs therapy and who were encouraged to eat a lot of green leafy vegetables. Over sixty species of green leafy vegetables are widely consumed in Nigeria (Okoli *et al*., 1988).

MATERIALS AND METHODS

Procedure: Five milliter of venous blood collected from each subject under aseptic conditions into EDTA bottles were used to determine platelet count, erythrocyte sedimentation rate and packed cell volume. Eighty individuals of both sexes aged between 25-60 years (36.7±14.0 years) (HIV-) and 39.0±7.5 years (HIV+) made up of 26 HIV seropositive patients on ARV therapy

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Table 1: Platelet count, ESR and PCV of HIV + patients not on ARV therapy

Subjects /Patients	*Platelet count ($\times 109\ L^{-1}$)	*ESR ($mm\ h^{-1}$)	*PCV (%)
Control (n = 28)	251.4±64.97	14.29±6.37	41.00±4.57
Patients (n = 26)	81.50±31.26	95.00±25.2	24.81±2.10
P value	p = 0.05	p = 0.05	p = 0.05

* Mean±SD

(group 3); 26 HIV seropositive patients not on ARV therapy (group 2) and 28 HIV seronegative but apparently healthy individuals (control)(group 1) at HIV/AIDS clinics of University of Nigeria Teaching Hospital (UNTH) Enugu, South East, Nigeria who met the inclusion criteria were enlisted for this study (Table 1).

Period of study, ethical clearance and informed consent: This study was carried out between January and September 2004. Informed consent were sought and obtained from all individuals who were enlisted in this study. Approval was obtained from the ethical committee of the UNTH, Enugu before the commencement of this study.

Antiretroviral therapy: The second line regimen of ARVs-stavudine (d4T) (40 mg b.d) (Bristol-Myers Squib); lamivudine (3Tc) (150 mg b.d) (GSK) and Nevirapine (NVP)(200 mg b.d) (Boehringer Ingelheim/Roxanne laboratories were administered to the HIV patients in group 3 for 12 weeks after HIV screening tests were done with HIV kits for HIV-1/HIV-2 and confirmed with western blot technique. The subjects consisted of 27 male HIV + and 25 HIV + female patients and 28 HIV-subjects (control). Platelet counts were determined by manual method (Lewis, 1979) and erythrocyte sedimentation rate determined methods of Westergren (1978) and packed cell volume by microhaematocrit centrifuge method with samples centrifuged at 1000 r.p.m for 5 min using capillary tubes (ICSH, 1993). The data was statistically analysed using Student's t-test and p values less than or equal to 0.05 was considered significant. The data are presented in mean±SD. Patients were encouraged to eat diets fortified with various green leafy vegetables which are regular ingredients of Nigerian soups/stews/salads such as pumpkin leaves, green (amaranthus), bitter leaf, anara leaves, garlic, ginger.

RESULTS

The result showed that the mean platelet counts and ESR were greatly increased in the HIV +patients taking ARVs and vegetable rich diets (Table 2). The ARVs increased their platelet counts by over two and half folds, ESR by six and half folds while the PCV was decreased to 29.1% as against 41.00% in the control ($p \leq 0.05$). Also, the result of the HIV+ patients not on ARV therapy showed that the platelet count was decreased by three folds ($251.4\text{-}81.5 \times 10^9\ L^{-1}$), ESR was increased by six folds as in HIV + patients on ARVs while the PCV decreased to 24.81 % as against 41.00 % in the control.

Table 2: Platelet count, ESR and PCV of HIV + patients on ARV therapy

Subjects/ Patients	*Platelet count ($\times 109\ L^{-1}$)	*ESR ($mm\ h^{-1}$)	*PCV (%)
Control (n = 28)	251.4±64.97	14.29±6.37	41.00±4.57
Patients (n = 26)	556.0±153.9	92.15 .±10.31	29.10±3.10
P value	p = 0.05	p = 0.05	p = 0.05

*Mean±SD

DISCUSSION

From this study, haematocrit was reduced in both HIV + patients (on ARV drugs and those not on ARV therapy) to levels showing mild anaemia respectively. This confirmed the reported generalized effect of HIV/AIDS on haematopoietic and blood cells (Blockman, 1991).

However, ever the lower effect of HIV on PCV of HIV+ patients under ARV therapy compared with the effect on patients not on ARV therapy could probably be due to the vegetable enriched diets. Also, the toxic effect of ARVs reported to cause severe anaemia in an earlier study by Barry *et al.* (1994) did not produced the same effect in this study. Leafy vegetables rich in iron and vitamins have been used locally in Nigeria as haematinics (Alada, 2000; Dina *et al.*, 2000; Adedapo *et al.*, 2002) and this could have ameliorated the reported effects of ARVs and HIV infections on blood cells. Diets and supplements rich in fibres contain antioxidants known to protect cell damage (Ayuba and Erah, 2004). The role of nutrition in reinforcing the effects of drugs taken is a well known panacea (FAO, 2007; Seune-Fosso *et al.*, 2004; Erah *et al.*, 2003). Ayuba and Erah (2004) demonstrated the anti-HIV effect of a herbal preparation of 'jobelyn' sourced from guinea corn (sorghum bicolor) and rich in antioxidants (Brunswick laboratories, USA), a good alternative supplement to ARVs in the management of HIV / AIDS.

Another study showed that 'jobeyln' reversed anaemia caused by parasitic infection in laboratory rabbits (Erah *et al.*, 2003). An exceedingly increased platelet counts in patients under ARV therapy confirmed the thrombocytotic (increased platelet counts) (Peechere *et al.*, 1993). Hence, the thrombocytopenia observed in HIV + patients not on ARVs was consistent with the works of Louche *et al.* (1994), Blockman (1991) and Candido (1990). The PCV was decreased and this was in line to the observation of Emokpae *et al.* (1999) in Nigeria while ESR remained the same in both categories of HIV + patients (Table 1 and 2) but these levels elevated above

the values for the control was suggestive of the presence of an infective disease like HIV (Blockman, 1991). Thrombocytopenia is associated with HIV infection (Cheesbough, 2000) while the increased ESR could be attributed to anaemia, or secondary to parasite infection (Bulls and Brailsford, 1972; Moyle, 2002; Striker *et al*., 1987). It is concluded that ARV therapy reversed the thrombocytopenia (decreased platelet counts) by HIV, increased the ESR and ameliorated PCV in HIV + patients maintained on green leafy vegetables fortified diets.

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