

Role of alcoholic root concoctions on haematological and renohepatic function markers among HIV patients in some rural communities in Eastern Nigeria

N.M. IGBOH¹, N.C. CHIGBU, E.N. AGOMUO², A.U. AUDU³, D. ONWUBIKO¹, C.I. EMUCHEY¹, C.A. MADUAGWUANA, I. ONYESOM⁵ and U.E. UZUEGBU

¹College of Medicine and Health Sciences, Abia State University Uturu (Nigeria).

²Department of Biochemistry, Faculty of Science, Imo State University, Owerri (Nigeria).

³Godwin Hospital, Off Sacred Heart, Faulks Road, Aba, Abia State, (Nigeria).

⁴Department of Pharmacology, College of Medicine, Abia State University, (Nigeria).

⁵Department of Medical Biochemistry, Delta State University, Abraka (Nigeria).

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ABSTRACT

The spread of HIV is taking a frightening dimension among the rural people in Nigeria. Even in a situation, where some of these individuals exhibit suggestive symptoms of HIV infection or have been diagnosed HIV positive, instead of seeking for adequate medical care will rather take various alcoholic root extracts thereby, prolonging the time they would have used to seek appropriate medical care. We therefore carried out the normal routine HIV tests on the individuals who took such alcoholic root extracts before seeking for medical care and individuals that had not taken such extracts before coming to the hospital, focusing precisely on haematological indices, renal and liver function tests. Blood sample was collected from two hundred individuals involving 96 males and 104 females who took such alcoholic root extracts in Aba metropolis for more than six months before coming to the hospital. One hundred HIV positive patients who did not take such alcoholic extracts served as control. The haematological parameters monitored include total white blood cell counts (WBC), lymphocytes (L) neutrophil (N) counts, packed cell volume (PCV) and Hemoglobin (Hb) level. Biochemical parameters estimated were the concentrations of urea and creatinine. Serum aspartate transaminase (AST) and alanine transaminase (ALT) were also assayed. In addition, total bilirubin was also determined. As compared with patients who never took alcoholic root extracts, the patients that took such extracts before coming to the hospital when the symptoms manifested were severe, exhibited significant decrease in CD₄, WBC and lymphocyte counts ($P < 0.05$). There was a slight increase in neutrophil number in those that used the alcoholic extracts compared with their HIV positive counterpart that never took such extracts. Observed in the same group was a significant reduction in Hb and PCV ($P < 0.05$). The activities of AST and ALT were also elevated in these individuals, same with total bilirubin. However, the concentrations of urea and creatinine were significantly different within the two groups ($P < 0.05$) but the concentrations obtained were within the normal range. The study tend to suggest that taking these alcoholic root extracts and delay in seeking appropriate medical care may accelerate the progression of HIV to AIDS.

Key words: Bilirubin, HIV, AIDS, Alcohol, CD₄

INTRODUCTION

HIV and AIDS pandemic has torn the social, economic and political fabric of several societies to shreds. Africa stands as the worst affected continent accounting for over three quarters

of the 42 million cases world wide (Achebe, 2004). Nigeria contributes significantly to these Africa figures. Current estimate places the rate of spread of HIV in Nigeria at one person per minute. Heterosexual transmission of HIV is primarily the mode of spread in Nigeria (Achebe, 2004).

In most of the developing world, sexually active youths (15 – 24 yrs), are the most vulnerable to HIV infections. Several factors contribute to the spread of HIV infections in Nigeria. Some of these include high prevalence of untreated sexually transmitted infections (STIs), low condom use, poverty, illiteracy and the dismal quality of the health system. Some others include stigmatization and ignorance of HIV risk among vulnerable groups (Achebe, 2004).

By progressively destroying the immune system, HIV weakens the body's ability to fight diseases, making it prone to opportunistic infections. Infections, which are rarely seen in those with normal immune system but pose a deadly threat to HIV patients. One of these infections is tuberculosis (TB), an ancient infection that is enjoying resurgence as the leading cause of death from a single pathogen. The spread of TB may be due to inadequate medical treatment. TB is said to play a mutual role in the progression of HIV infection to AIDS.

Incidentally, the spread of HIV is taking a frightening dimension among the rural people in Nigeria. The factors responsible are essentially illiteracy and ignorance of the existence of HIV infection. Even in situation where some of these individuals exhibit suggestive clinical signs of HIV infection or have been diagnosed HIV positive, instead of seeking adequate medical care, will rather attribute their failing health to either witchcraft or unknown medical conditions. Some will secretly seek help from a herbalist who will promise to cure them by giving them various alcoholic root extracts. Unfortunately, previous studies have revealed that alcohol potentiates hepatocyte damage (Igboh *et al.*, 2006; Guerri and Griolia, 1980; Chiapotto *et al.*, 1995). The study of Latvala *et al.*, (2004) implicates alcohol to cause destruction of blood cells, subsequently leading to weak immune system and anaemia in alcoholics. Various animal and human studies have demonstrated other deleterious effects of alcohol on various organs of the body (Igboh and Braide, 2003; Niemele, 2004). Other studies indicated equally that alcohol mainly potentiates hepatocyte damage through its microsomal metabolism via cytochrome P₄₅₀, especially (CYP₄₅₀ 2E₁) which results in a significant release of free

radicals particularly reactive oxygen species (ROS). These in turn deplete reduced glutathione (GSH) and other defense systems necessary to combat oxidative stress and also protect the liver (Lieber, 1997; Lieber, 2000a and b). Other studies have implicated the ROS generated from alcohol metabolism to cause many diseases other than liver disease; these include autoimmune disease e.g. rheumatoid disease, haemochromatosis, atherosclerosis and cardiovascular disease (Lieber, 1997 Lieber, 2000, Griending and FitzGerald, 2003). It was based on the findings of these deleterious effects of alcohol, that promoted the investigators to become interested in carrying out routine HIV test on patients that had taken alcoholic root extracts before coming to the hospital to seek appropriate medical care and others that had not, focusing precisely on haematological indices, renal and liver function tests.

MATERIAL AND METHODS

Subject/Samples

Blood samples was collected from two hundred individuals with suggestive HIV symptoms (96 males and 104 females) who took local alcoholic root extracts for more than six months before coming to the hospital. One hundred HIV positive patients who did not take such alcoholic extracts served as control. These groups of patients were tested with Immuno Comb 1 & 2 (Organics Ltd Yavne 706 50, Isreal). HIV – kit and confirmed HIV-1-infected using ELISA Kits (SUDS HIV 1 & 2 Murex) diagnostic method. About 7ml of venous blood was collected from each subject. Two milliter part of the blood specimen was put into a clean universal container containing EDTA anticoagulant for haemoglobin, packed cell volume estimation, total and differential white cell count and the CD₄⁺T cells. The remaining 5ml of blood was allowed to clot and the serum used to assess the concentration of urea and creatinine to ascertain their renal status. Serum aspartate transaminase (AST) and alanine transaminase (ALT), in addition to total bilirubin were analysed to assess their liver functions.

Sample analysis

The Coulter Manual CD₄ count kit of (Beckman Coulter, PN 4 2 36245-D) was used to identify and enumerate the CD₄⁺T cells.

For Hb, the cyanomethaemoglobin method of Fairbanks (1982) was used. While the method of Dacie and Lewis, (1991) was used. For PCV, lymphocyte, neutrophile, and total WBC count. The methods of Wybenga_ *et al.* (1971), Owen *et al.* (1954) were employed in determining urea and creatinine concentrations. The activities of AST and ALT were determined using Reitmen and Frankel, (1957) method. Total bilirubin was determined using MacDonald (1965) method.

Statistics

The statistical analysis used was the one-way analysis of variance, ANOVA. This was used for haematological parameters, while the Student's T test was used in evaluating other parameters (Obi, 1986).

RESULTS

The values obtained are shown on Tables 1 and 2. Table 1 summarized the haematological parameters, while Table 2 highlights the changes in serum urea, creatinine, bilirubin and liver enzymes (AST and ALT) activities. The data were obtained from HIV patients who did not take local alcoholic root extract before presenting themselves for proper medical examination.

As compared with patients who did not take alcoholic root extracts, those who took alcoholic root extracts before coming to the hospital when the symptoms manifested were severe exhibited significant decrease in CD₄, WBC and

Table 1: Haematological parameters of HIV patients who took alcoholic root extracts and HIV patients who did not

| | CD ₄ ⁺ (C/mm ³) | Total WBC (x10 ⁹ L) | Lymphocyte (C/mm ³) | Neutrophiles (C/mm ³) | PCV (%) | Hb (g/100ml) |
|--|--|-----------------------------------|------------------------------------|--------------------------------------|------------|-----------------|
| HIV patients' A(n=100) (Did not take extract) | 229.4±48.9 | 6.2±1.5 | 49.2± 22.8 | 35.9 ± 6.2 | 40.9±7.0 | 9.9 ±2.5 |
| HIV patients' B(n=200) (Took extracts) | 104.4±38.4* | 4.8±0.9* | 29.8 ±15.3* | 36.1± 16.8 | 22.0±1.8* | 8.2 ±1.5* |

* Significant difference at P < 0.05

Data are expressed as Mean ± SD for 'n' subjects

Table 2: Values of some biochemical parameters in HIV positive subjects who did or did not take the alcoholic root extracts

| | Urea (mmol/L) | Creatinine (mg/100ml) | AST (U/L) | ALT (U/L) | Total bilirubin (mg/dL) |
|---|------------------|--------------------------|-------------|------------|----------------------------|
| HIV patients' A(n=100) (Did not take extracts) | 4.0 ± 2.0 | 0.6 ± 0.7 | 31.6 ± 5.0 | 23.1 ± 1.8 | 0.22± 0.3 |
| HIV patients' B(n=200) (took root extracts) | 6.3 ± 3.3* | 1.0 ± 1.8* | 78.0± 22.9* | 37.4±12.0* | 0.40 ± 7.1* |

* Significant difference at P < 0.05

values are Mean ± SD for 'n' patients.

lymphocyte counts ($P < 0.05$ Table 1). There was a slight increase in neutrophil number in those HIV patients that used the alcoholic extracts compared with their HIV positive counterpart who did not. Observed in the same group was a significant reduction in Hb and PCV ($P < 0.05$). Under biochemical parameters monitored, the activities of AST and ALT were also elevated in these individuals, same with total bilirubin. However, the concentrations of urea and creatinine were significantly different within the two groups ($P < 0.05$ Table 2).

The result equally revealed a significant increase in the level of total bilirubin in HIV patients who took alcoholic extracts compared with HIV patients who did not take alcoholic root extracts.

DISCUSSION

The remarkable decline in CD_4^+ , WBC, lymphocyte and neutrophil in patients took alcoholic extract and delayed before attending hospital seems to be the combined effects of the HIV and generation of much free radicals particularly (reactive oxygen species (ROS) through the microsomal metabolism of alcohol via cytochrome P_{450} . Ordinarily, those with Human Immuno deficiency virus generate a lot of ROS (Igboh, *et al.*, 2006). And alcohol metabolism also results in generation of much ROS. Normally, ROS react directly with cellular lipids, proteins and DNA causing cellular damage and death of cells (Davies, 1995 Hensley, *et al.*, 2000; Hemnani and Parihar, 1998). Although ROS can only manifest their effects when cellular antioxidant defenses are over whelmed (Igboh, *et al.*, 2006). Depletion of these antioxidants like glutathione, vitamin C and E will therefore render the blood cells very fragile, thus leading to accelerated destruction of the blood cells particularly the white blood cells (Plit *et al.*, 1998; Van Antwerpen, *et al.*, 1994; Van Antwerpen, *et al.*, 1995; Van Antwerpen, *et al.*, 1995; Ayalogu *et al.*, 2001). The low CD_4^+ , total WBC, lymphocyte and neutrophil counts, including PCV and Hb are indicative of massive destruction of

blood cells which can lead to anaemia, weak immune system and hence, enhance susceptibility to various infections associated with HIV infections.

The elevation of AST in HIV positive patients who took root alcoholic extracts was not surprising considering that AST is elevated in conditions as in hemolytic anaemia due to destruction of red blood cells, cardiac and muscular dysfunctions. The destruction of blood cells may be one of the factors responsible for the high activity of AST in the plasma. Evaluation of ALT appears to reflect hepatic disease and it is more specific for hepatic disease than AST, because of the biochemical location of the enzymes. Although the activities of any of the enzymes (ALT or AST) may be elevated in extra hepatic disease, however, the elevation of ALT may reflect some inflammatory disease or injury to the liver.

The ratio of AST to ALT is also helpful in diagnosing hepatic function. An AST: ALT ratio of more than 2 : 1 is characteristic of patients with alcoholic liver disease. From the results [(control- AST 31.6 and ALT 23.1), (test - AST 78.0 and ALT 37.4)]. The ratio of AST/ALT for control is 1.4:1 and 2.1: 1 for HIV patients that took alcoholic root extracts. These points to the possible effect of alcohol in these individuals.

To further confirm hepatocellular status, the determined serum total bilirubin levels suggest hepatocellular dysfunction.

The study suggest that taking local alcoholic root extracts and delay in seeking appropriate medical care may cause rapid deterioration and accelerate the progression of HIV to AIDS.

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