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Liver enzymes activities in Nigerian local gin (Ogogoro) consumers

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ABSTRACT

The uncontrolled sales and the relatively cheap price of local gin (ogogoro) in Nigeria have increased its consumption among the populace. The liver being the chief metabolizing organ of alcohol is greatly at risk. This study was carried out to determine the serum activities of the aminotransferases (ALT and AST) in sixty (60) ogogoro consumers and forty (40) apparently healthy non alcoholic beverages consumers as controls. The serum activities of ALT and AST were determined using standard method. The results obtained showed that the mean serum activities of AST, ALT and AST/ALT ratio in ogogoro consumers were significantly increased when compared with control. Also the mean serum activities of AST, ALT and AST/ALT ratio in ogogoro consumers of above ten (10) years duration were significantly increased when compared with control. The study therefore concluded that local gin (ogogoro) has a lethal effect on the liver cells and that the duration of alcohol consumption is a major determinant of the degree of alcoholic liver disease, which can be monitored through the AST/ALT ratio (with a value greater than 2.0 as an indicator).

Keywords: liver enzymes, ALT, AST. Ogogoro, alcohol

INTRODUCTION

Traditional alcoholic beverages have been consumed in present-day Nigeria and other West African countries for centuries [1, 2]. Before the arrival of Western-factory made drinks, alcohol consumption was limited to a variety of beverages produced from palm trees and food grains [1].

Local gin (ogogoro) is locally distilled spirit drink from palm wine, with a historical significance in Nigeria because, as a local gin, colonial administrators barred it in an attempt to control the West African liquor trade in the early part of last century [1]. Men mainly consume Ogogoro and in some few exceptional cases by women.

Local gin (ogogoro) contains about 78% alcohol and many impurities that are toxic and carcinogenic [3]. Therefore, the liver being a chief metabolizing organ for alcohol is especially vulnerable to alcohol-related injury [4]. Excessive consumption of ogogoro has a great effect on the liver functions and may cause injury to the liver. Since the liver has a large functional reserve, this may not be noticed early because in many cases, individuals with liver damage maintain normal functions despite extensive liver damage [5]. In such cases, liver disease may only be recognized by using tests that detect liver cell injury. The aim of this study was to determine the serum activity of Aspartate aminotransferase (AST), Alanine aminotransferase (ALT) and the ratio of AST to ALT in ogogoro consumers with a view of identifying the degree of liver cell damage.

MATERIALS AND METHODS

Subjects: The study population comprised of sixty (60) subjects (males) within the age range of 18-55 years that consume ogogoro mainly as source of alcohol. Thirty-eight (38) and twenty-two (22) of these subjects have

consumed ogogoro for less than 10 years and more than 10 years respectively. Informed consents was sorted for and obtained from each subjects and histories of their drinking and other social habits were obtained with a questionnaire. The control group comprised forty (40) apparently healthy; sex and age matched non alcoholic beverages consumers.

Blood samples collection: five millilitres of venous blood samples was collected from the antecubital vein under aseptic precaution from each subject and was carefully dispensed into the sterile plain plastic container and was labelled appropriately. This was allowed to clot after which they were carefully dislodged with a dropper pipette (avoiding lysis) and was centrifuged at 3000rpm for 10minutes. The sera were separated immediately with the aid of a Pasteur pipette into other clean plastic bottles with the corresponding labels. These sera were frozen until the time of analysis.

Assay: The aminotransferases (AST and ALT) activities in the samples were determined using the method described by Reitman and Frankel (1957) [6].

Statistical analysis: Data were presented as mean \pm S.D. Test of significance was determined using Student's t-test and $p < 0.05$ was considered significant.

RESULTS

The study showed that the serum activity of AST and AST/ALT ratio was significantly increased in ogogoro consumers as compared to control while the ALT activity was decreased although not significant (see Table 1).

There is no statistically significant difference in the serum activity of AST and ALT and AST/ALT ratio in ogogoro consumers of less than 30 years but serum activity of AST was significant higher ($p < 0.05$) in ogogoro consumer of above 30 years as shown in table 2.

On duration of ogogoro consumption, consumers of above ten years showed a significant decrease ($p < 0.05$) in serum activities of ALT and a significant increase in AST and AST/ALT ratio while consumers of less than ten years show no significant difference in the serum activity of ALT and AST and AST/ALT (Table 3).

Table 1 Serum activities of AST and ALT and AST/ALT ratio in ogogoro consumers compared with controls

Parameters	Ogogoro consumers N=60	Controls N=40	t-value	p-value
ALT (IU/L)	4.37 \pm 2.19	5.13 \pm 2.19	1.696	$p > 0.05$
AST (IU/L)	8.93 \pm 5.80	6.43 \pm 3.09	2.508	$P < 0.05$
AST/ ALT ratio	2.63 \pm 2.75	1.58 \pm 1.40	2.220	$P < 0.05$

P < 0.05 is significant

TABLE 2 Serum activities of AST and ALT and AST/ALT ratio in ogogoro consumers and controls below and above 30 years of age

LESS THAN 30 YEARS					ABOVE 30 YEARS			
Parameters	Ogogoro consumers N=28	Controls N=18	t-value	p-value	Ogogoro consumers N=32	Controls N=22	t-value	p-value
ALT (IU/L)	4.57 \pm 1.83	5.17 \pm 2.22	1.106	$p > 0.05$	4.18 \pm 2.48	5.00 \pm 2.16	0.929	$p > 0.05$
AST (IU/L)	7.46 \pm 3.37	6.73 \pm 3.22	0.844	$p > 0.05$	10.22 \pm 2.54	5.50 \pm 2.54	2.047	$P < 0.05$
AST: ALT	1.84 \pm 1.07	1.68 \pm 1.56	0.476	$p > 0.05$	3.25 \pm 3.54	1.31 \pm 0.73	1.708	$p > 0.05$

P < 0.05 is significant

Table 3 Serum activities of AST and ALT and AST/ALT ratio in ogogoro consumers for duration of below and above 10 years compared with controls

Less than 10 years					Above 10 years			
Parameters	Ogogoro consumers N=38	Controls N=40	t-value	p-value	Ogogoro consumers N=22	Controls N=40	t-value	p-value
ALT (IU/L)	4.89 \pm 2.37	5.12 \pm 2.19	0.446	$p > 0.05$	3.45 \pm 1.50	5.12 \pm 2.19	3.188	$P < 0.05$
AST (IU/L)	7.39 \pm 3.48	6.43 \pm 3.08	1.304	$p > 0.05$	11.59 \pm 7.84	6.43 \pm 3.08	2.968	$P < 0.05$
AST/ALRatio	1.78 \pm 0.99	1.58 \pm 1.40	0.708	$p > 0.05$	4.10 \pm 3.99	1.58 \pm 1.40	2.862	$P < 0.05$

P < 0.05 is significant

DISCUSSION

The results from this study showed that the AST/ALT ratio is more than 2.0 in ogogoro consumers when compared with control. Matloff *et al.*, (1980) [7] reported that AST/ALT ratio >2 is assumed to reflect an alcoholic aetiology of the liver disease. In addition, the sensitivity of AST and ALT as biomarkers for alcohol consumption is put at 56% and 47% respectively [8, 9].

The statistically significant decrease in the serum activity of ALT with an increase in AST and AST/ALT ratio of those that have consumed ogogoro for over 10 years is in agreement with the report of Skude *et al.*, (1977) [10] who opines that consumption of alcohol for over a period of 10 years increase the risk of alcoholic liver disease. The increase in AST may be due to increased cell membrane permeability, cell necrosis and mitochondrial leakage into the blood, caused by excessive alcohol consumption. Since AST is located both in the cytosol and in mitochondria, serum levels depend markedly on the degree of liver damage and on how recently the alcohol has been consumed.

The results obtained from ogogoro consumers below the age of 30, which is not statistically significant is in agreement with the report by Halvorson *et al.*, (1993) [11], who reported that aminotransferase markers are not accurate in alcoholics who are under the age 30 years but is accurate in those above 30 years. However, the result of ogogoro consumer above the age of 30 years showed AST/ALT ratio of above 2.0, with AST being statistically significant. The high AST/ALT ratio is an indication of alcohol related liver disease.

The result obtained from ogogoro consumers of less than 10 years shows that the duration of alcohol consumption is a determinant factor on its effect on the liver. The AST/ALT ratio is less than 2.0 and the aminotransferase activities were not statistically significant when compared with control.

Conclusively, the study therefore showed that local gin (ogogoro) has a lethal effect on the liver cells and that the duration of alcohol consumption is a major determinant of the degree of alcoholic liver disease

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