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Lipid Profile and Reductive Enzyme Activities in Chronic Alcoholics in Aba Metropolis

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Abstract

Purpose: Chronic alcohol consumption predisposes individuals to several disorders, though, such effect depends on its level of concentration in the blood overtime. To ascertain the effects of alcohol on various tissues and organs of the body, the study evaluated the plasma lipids and reductive enzymes in alcoholics in Aba Metropolis.

Methodology: A total of one hundred and fifty subjects comprising hundred alcoholics and fifty age marched non-alcoholics were included in the study. Subjects with chronic diseases or other health issues and subjects with intake of drugs like thiazides, beta blockers and steroids were excluded from the study while those who were regular drinkers met the inclusion criteria for the test group. Both the test group and control group resided within Aba Metropoli. The alcoholic subjects were grouped into moderate and heavy drinkers based on the amount of alcohols consumed per week. Serum was obtained from blood collected from the subjects by venipuncture was used to determine lipid profile and the reductive enzymes. The data obtained were analyzed using statistical package for social science (SPSS version 25) and analysis of variance (ANOVA). Significance level for the analysis was set at P-value equal to or less than 0.05 (P=<0.05).

Findings: There was a significant increase in the mean levels of TC, TG, LDL, GGT and LDH in heavy drinkers' alcoholics when compared to those who consumed alcohol moderately and non-alcoholics (control). In moderate alcoholics, there was significant increase in HDL and decrease in LDL when compared with heavy alcoholics. However, the increase in the assayed parameters in alcoholics suggest that high alcoholic beverages may induce derangement in some biochemical parameters monitored.

Recommendation: The study recommend that health awareness to be carried out to inform the public and vulnerable individuals on the risk of chronic alcohol consumption which may predispose them to various health problems.

Keywords: *Chronic alcohol, derangement, gamma glutamyl transferase, lactate dehydrogenase, total cholesterol.*

INTRODUCTION

Alcohol is a psychoactive drug that provides energy (7.1 kcal/g), however, excessive intake can increase the risk of weight-gain subsequent leading to development of obesity and malnutrition. Derangement of biochemical reactions as it relates to alcohol consumption has been documented including those of the central nervous system, fatty liver and kidney disease (Friedman, 2013). Also, included are liver cirrhosis, hepatitis and oxidative stress. These have been linked with long term alcohol consumption (Gupta *et al.*, 2010; Nestle & Hirsch, 2015). Alcohol abuse causes functional impairment of the accessory organs like the gastrointestinal tract, and pancreas. It also affects protein and lipid metabolism. The oxidative stress induced by alcohol affects the activities of Gamma Glutamyl Transferase and lactate dehydrogenase enzymes (Fisher *et al.*, 2008).

Fisher et al. (2008) revealed that alcoholics have slightly higher AST and GGT activities compared to non-consumers. Igboh and Braide 2003 demonstrated association between alcohol consumption and GGT which is a widely used index of excessive alcohol intake. GGT has been found to be a more sensitive indicator of moderate levels of alcohol consumption than AST and ALT. It is based on these findings that the study was carried out to ascertain the effects of alcohol on various tissues and organs of the body, by evaluating the plasma lipids and reductive enzymes in alcoholics in Aba Metropolis.

MATERIALS AND METHODS

The study was conducted in Abia State University Teaching Hospital Aba. This study included 100 alcohol drinkers (cases) and 50 non-alcohol drinkers (controls) without history of alcohol consumption. The subjects were all males within the age range of 18-57 years. Subjects were male individuals in Aba, Abia State, they were grouped according to age, and degree of alcohol consumption into moderate drinkers (=<14 bottles per week) and heavy drinkers (>14 bottles per week). Subjects with intake of drugs like thiazides, beta blockers and steroids were excluded from the study. High density lipoprotein cholesterol (HDL), Total Cholesterol (TC) Gamma glutamyl transferase (GGT), and Lactate dehydrogenase (LDH), were determined using Tiet (1995) methods.

Data obtained was analyzed using statistical package for social sciences (SPSS) (Indrayan and Kumar, 2017). The difference between the groups were compared using one-way analysis of variance (ANOVA) and student t-test with a P-value less than or equal to 0.05 (P=<0.05) which was considered as being statistically significant. Results were expressed as Mean ± SD (standard deviation).

FINDINGS

Table 1: Evaluation of the assayed parameters among test subjects and control based on alcoholic intake

Parameters	TC (mmol/L)	TG (mmol/L)	HDL (mmol/L)	LDL (mmol/L)	GGT (mmol/L)	LDH (IU/L)
Control	3.71±0.3	0.81±0.31	1.12±0.28	2.37±0.47	27.38±8.04	187.58±9.30
Moderate	4.08±0.60	4.1.09±0.40	1.16±0.33	2.70±0.67	35.16±7.80	197.78±10.50
Heavy	4.62±0.69	1.49±0.40	0.71±0.24	3.62±0.74	41.95±2.21	270.84±14.04

Table 1 showed the levels of different biochemical markers (lipid profile parameters and enzyme activities) in moderate to heavy drinkers which tend to be more pronounced in heavy drinkers compared to moderate drinkers and control.

Table 2: Comparison of assayed lipid profile and reductive enzymes of test subjects according to history of alcoholism

History (Years)	TC (mmol/L)	HDL (mmol/L)	LDL (mmol/L)	GGT (mmol/L)	LDH (IU/L)
<10	4.07±0.47	1.22±0.44	1.02±0.36	2.81±0.54	234.17±138.33
10-19	4.55±0.43	1.44±0.46	0.76±0.35	3.51±0.62	246.58±145.96
20-29	4.84±0.99	1.46±0.26	0.87±0.29	3.67±1.14	240.2±96.84
>30	5.86±0.88	1.26±0.48	0.68±0.11	4.93±0.92	235.6±29.70
P-value	0.000	0.085	0.05	0.000	0.982

Table 2 showed variation in lipid profile parameters and enzyme activities according to history of alcoholism, which was highest in those that consumed alcohol for more than thirty years. There was significant increase in the mean levels of TC, TG, LDL, GGT and LDH in heavy drink alcoholics when compared to those who consumed alcohol moderately, and non-alcoholics (control), while in moderate alcoholics there was significant increase in HDL and decrease in LDL when compared with heavy alcoholics. However, the increase in the assayed parameters in alcoholics suggests high alcoholic beverages may induce derailment in some biochemical parameters. Changes in liver enzyme activities when elevated are biomarkers of liver damage and are routinely assessed for diagnostic purposes to aid early detection of such alteration (Fisher *et al.,* 2008).

In this study, the heavy alcoholic drinkers had the highest total cholesterol level (4.62 ±0.69) and when compared with moderate dose alcoholics and non-alcoholics which was statistically significant in each comparison. This correlates well with other studies (George *et al.,* 2019). Concordantly, this study reported that serum LDL level was significantly decreased in the moderate consuming alcoholics when compared with heavy drinkers, but significantly higher when compared with the nonalcoholic p-value =<0.05, this disagrees with another study that found Serum LDL level significantly decreased in the moderate drinking alcoholics when compared with the control group (George *et al.,* 2019).

Again, Gamma Glutamyl Transferase level significantly increased with alcohol consumption when compared with non-alcoholic(controls) which adds to the same observation made in other studies, that Alcohol drinking independently raised GGT levels, and we found that GGT showed the largest increases associated with heavy drinking alcoholics (Nestle & Hirsch, 2015; George et al., 2019). The mean Serum total LDH were significantly higher in patients with alcoholic history when compared to the control. It has been reported that serum activity of LDH is influenced by Liver cirrhosis. Herein, we observe a significant elevation of LDH serum activity in alcoholic group compared with control and such increases may suggest increase in oxidative stress together with hepatocellular derangement.

RECOMMENDATION

The study recommend that public health awareness to be carried out to inform the public and vulnerable individuals on the risk of chronic alcohol consumption which they might have been overlooking.

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