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Some Haematological and Biochemical Parameters of Chronic Alcoholics in Umuahia, Abia State, Nigeria.

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ABSTRACT

Some haematological and biochemical parameters were studied in chronic alcoholics at selected drinking bars in Dozie Way, Ihie Ndume, Umuahia, Abia State, Nigeria. Alcohol is widely consumed by many in this area.74 subjects were used for the study. 44 subjects were chronic acoholics (Test) and 30 were non-alcoholics (Control). All the subjects were males with average age of 33 years.There were significant changes ($P<0.05$) in mean values of haematological parameters studied relative to the control.There were significant changes ($P<0.05$) in the mean values of liver enzyme actvities when the test was compared to the control but no signicant chagnges ($P>0.05$) in the mean values of Total protein, Total Cholesterol, Urea, Bicarbonate and Chloride relative to control.

Keywords: Alcohol,Haematological parameters and Biochemical parameters

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INTRODUCTION

In chemistry, an alcohol is an organic compound in which the hydroxyl functional group (-OH) is bound to a carbon atom. An important class of alcohols are the simple acyclic alcohols. Of those, ethanol is the type of alcohol found in beverages and in common speech the word alcohol refers specifically to ethanol (IUPAC Compendium of Chemical Terminology, 2006). In every day life alcohol without qualification usually refers to ethanol, or a beverage based on ethanol. An alcoholic beverages are divided into three general classes for taxation and regulation of production:beers,wines,and spirits.They are legally consumed in most countries around the world(International Centre for Alcoholic Policies, 2009). Beer is the third most popular drink in the world, after water and tea (Nelson, 2005). Alcoholic beverages have been consumed by humans since the Neolithic era;the earliest evidence of alcohol was discovered in Jiahu, dating from 7000-6600 B.C. (McGovern *et al*.,2004). The production and consumption of alcohol occurs in most cultures of the world, from hunter-gatherer peoples to nation-states(Arnold, 2005).

Acoholic beverages are a source of food energy. Each gram of alcohol provides 7.1Kcal and each millilitre provides 5.6Kcal.

Since ancient times,people around the world have been drinking alcoholic beverages.Reasons for drinking alcoholic beverages vary and include:being part of a standard diet,medical purposes,relaxant effects,euphoric effects, recreational purposes,artistic inspiration,putative aphrodisiac effects and happiness (Harter, 2013).
Alcohol is a psychoactive drug.It has both anesthetic,disinfective properties and can be used as protein precipitant (fixative) and local irritant.The metabolic effect could be pleasant or unpleasant.Ethanol itself is water soluble and is rapidly absorbed in the upper portion of the small intestine,the alcohol laden then travel to the liver through veins and capillaries of the digestive tract which affects nearly every liver cells.The effect of alcohol varies with individuals according to the availability of NAD and alcohol dehydrogenase availability within the system and on the quantity of alcohol ingested.Chronic alcohol consumption in large doses could damage the vital organs such as brain, liver, stomach, heart, it could also predispose to cancer. Alcohol is one of the few substance that can penetrate the stomach lining and causes damage to the villi of the intestine.

The liver ultra sound examination is most helpful in determining the presence of hepatobiliary disease which is the most common cause of liver disease in chronic alcoholism,others include malnutrition,hepatitis,toxic chemical,etc.No matter what the cause of liver disease,patient that are diagnosed having a liver diseases are advised to stop drinking alcohols.

Alcohol has been used medically throught out recorded history;its medical properties are mentioned 191 times in the Old and New Testaments(Oyedeji et al,2013).It has been shown in epidemiological studies that moderate consumption of alcoholic beverages has a protective effect against the clinical complications of coronary heart disease(De Wood et al,2001).An analysis of pairs of twins with different drinking patterns found that those who consumed alcohol in moderation has half the risk of developing type2 diabetes compared to those who consumed less alcohol(Carlsson et al,2003).A study in

developing monkey has demonstrated detrimental effect of alcohol on the activation of hormone secretion that accompanies female puberty(Dees et al,2000).Research with adult rats has shown that alcohol increases opoid activity in the brain(Froehlich,1993).It has also been reported that some of the commonly ingested alcoholic beverages are potent stimuli of gastric acid output(Singer et al,1987).

Heavy intake of alcohol is a leading cause of preventable mortality,second only to cigratte smoking in industralised countries.Alcohol is implicated in >40% of all fatal traffic accidents, in 25% of all general hospital admissions, in liver and upper gastrointestinal cancers,suicides,sex crimes,industrial accidents,robbery and murder and foetal alcohol syndrome.On the context of promotion of disease or death there is evidence to suggest that moderate alcohol intake reduces risk of coronary heart disease is the leading cause of death in most affluent societies(Akanni et al,2010).

Acute and chronic alcohol abuses are common conditions in patients admitted to hospitals.Alcohol has direct and indirect effects on the haematologic system which can mimic and or obscure other disorders.Leucocytes,erythrocyte and thrombocyte production and functions are affected directly.Liver damage secondary to alcohol abuse also impacts red blood cells and the haemostatic mechanisms(Akanni et al,2010).Nutritional deficiencies are caused not only by poor dietary habits practiced by alcohol abusers but by the effect of alcohol on the absorption,storage and utilization of several vitamins(Hermans,1998).
Investigation of large-scale observational cohorts have suggested that light to moderate drinking may be associated with decreased mortality rates and with decreased risk of cardiovascular disease(Lucas et al,2005).The subjects of alcohol and heart attack is important because the major cause of death in many countries is cardiovascular disease(Akanni et al,2010).

Besides cardiovascular disease,many of the pathophysiological effects of alcohol ingestion are related to the pathway of ethanol metabolism(Peters and Preedy,1998).Findings suggest that alcohol abuse results in adverse patterns of haematological effects and affects several cell lines.Alcohol suppresses platelet production and causes thrombocytopenia which result in platelet abnormalities; inhibition of platelet aggregation(Sellah and Bobzien,1998).

Unfortunately, alcohol abuse is known to have a wide array of adverse effects of the transport medium in the cardiovascular system,blood.The mechanisms by which it does so have not yet been establihed but there is considerable evidence which reveals adverse effects on serum proteins, blood cells and thier progenitors in the bone marrow (Jaana,2004).

The impact of alcohol on the haematopoietic system can be divided into direct and indirect effects.Direct effects are primarily seen in the bone marrow and involve the white cell,red cell and platelet lines.Indirect effects are secondary to metabolic or pysiologic alteractions resulting in liver disease and to nutritional abnormalities,such as folate deficiency(Hermans,1998).

Haematological abnormalities are frequently found in heavy-drinking alcohols but anaemia is generally with feed haematlogical examination of the alcohol consumers is to include;Red Cell Indices;red blood cell count,packed cell volume,mean cell volume,mean cell haemoglobin concentration,white blood cell count,platelet count and cell morphology.Cell counts reflects the kinetics of entry and loss of cells from circulation and cell morphology reflects the status of individual cells which is a direct reflection of the health of the bone marrow,the circulation and the tissues(Akanni et al,2010).

Alcohol is metabolised in the liver by cytoplasm enzyme alcohol dehydrogenase.This enzyme catalyses the oxidation of ethanol to form acetaldehyde and this reaction requires nicotinamide adenine dinucleotide(NAD) and generation of NADH, which can be channelled into the electron transport chain.In this study, some haematological parameters and biochemical parameters are studied in chronic alcoholics to ascertain the effect of chronic consumption on these parameters.

MATERIALS AND METHODS

Study Area

The study was done in some drinking bars in Dozie Way,Umuahia,Abia State, Nigeria.

Subjects and Methods

44 Chronic acoholics(test) and 30 non-acoholics(control) in Dozie Way,Umuahia, Abia State were chosen for the study.Venous blood samples were collected from the subjects into EDTA anticoagulated containers for haematological test and the other collected into plain tubes for the serum after separation when clotted and retracted for the biochemical test.

STATISTICAL ANALYSIS

The data were analysed by t-test with significant level set at $P<0.05$.

Ethics: Oral consents were made to the subjects prior to the sample collection and they were assured of the confidentiality of the results.

DISCUSSION

Table1 showed significant decrease ($P<0.05$) in the mean values of PCV, Neutrophil and Monocyte and significant increase ($P<0.05$) in the mean values of TWBC, Lymphocyte and Eosinophil count relative to the control. Alcohol exerts a direct toxic effect to the bone marrow resulting in vacuolization of the bone marrow precursor cells,anaemia,leukemia and thrombocytopenia(Akanni et al., 2010). It also affects the functions of the leucocytes and platelets. Haematological function are affected indirectly from nutritional deficiency,chronic liver disease and other metabolic derangement(Chu,2000).This has also been supported by Hermans(1998) who reported that alcohols have a wide spread direct and indirect effects on the haematological system which mimic and obscure other disorders.Leucocytes,erythrocytes and thrombocytes production and functions are affected

directly. Liver damage secondary to alcohol abuse also impacts on red blood cells and haemostatic mechanism (Akanni et al., 2010). The study was in accordance with the work of Oyedeji et al (2006) on male albino rats where they studied the haematological effects and biochemical effects of alcohol on the rats. There was significant decrease and increase($P<0.05$) in Neutrophils and Lymphocytes but no significant change($p>0.05$) in TWBC, PCV in their study.

RESULTS

Table1: Mean Values Of Some Haematological Parameters Of The Chronic Alcoholics(Test) And The Non-Alcoholics(Control)

Parameters	Mean+/-SD	Subjects	P-Value
PCV(%)	32.0+/-1.5	Test(44)	
	43.2+/-2.4	Control(30)	P<0.05
Hb(g/dl)	10.5+/-0.4	Test(44)	
	14.0+/-1.7	Control(30)	P<0.05
TWBC(*10/L)	8.0+/-1.2	Test(44)	
	4.0+/-1.5	Control(30)	P<0.05
Neutrophil(%)	40.3+/-3.6	Test(44)	
	58.0+/-2.6	Control(30)	P<0.05
Lymphocyte(%)	56.2+/-4.2	Test(44)	
	38+/-1.4	Control(30)	P<0.05
Monocyte(%)	0.9+/-0.53	Test(44)	
	4.0+/-0.8	Control(30)	P<0.05
Eosinophil(%)	2.6+/-0.45	Test(44)	
	0.0+/-0.0	Control(30)	P<0.05

Table2: Mean Values Of Biochemical Parameters Of The Chronic Alcoholics(Test) And Non-Alcoholics(Control)

Parameters	Mean+/-SD	Subjects	P-Value
AST(iu/L)	17.60+/-1.88	Test(44)	
	12.40+/-1.14	Control(30)	P<0.05
ALP(iu/L)	33.40+/-2.41	Test(44)	
	26.0+/-5.72	Control(30)	P<0.05
ALT(iu/L)	15.07+/-1.94	Test(44)	
	9.20+/-1.48	Control(30)	P<0.05
Creatine Kinase(iu/L)	62.80+/-2.70	Test(44)	
	50.80+/-5.50	Control(30)	P<0.05
Toal Protein(mg/dl)	6.71+/-4.53	Test(44)	
	6.88+/-7.20	Control(30)	P>0.05
Total Cholesterol(mg/dl)	206.60+/-9.84	Test(44)	
	204.20+/-5.86	Control(30)	P>0.05
Urea(Mg/dl)	6.42+/-5.90	Test(44)	
	6.40+/-3.83	Control(30)	P>0.05
Bicarbonate(Mmol/L)	26.67+/-2.09	Test(44)	
	26.50+/-2.24	Control(30)	P>0.05
Chloride(Mmol/L)	98.74+/-1.70	Test(44)	
	98.33+/-1.40	Control(30)	P>0.05

Table 2 showed significant increase($P<0.05$) in AST,ALP,ALT,Creatine kinase but no significant change ($P>0.05$) in Total Protein,Total Cholesterol,Urea,Bicarbonate and Chloride

which agreed with the work of Oyedeji et al (2006). The liver enzymes had increased activity showing danger to heavy alcoholic drinkers and equally to the heart because of significant increase ($P<0.05$) in Creatine Kinase

CONCLUSION

The study showed increased activities of the liver enzymes because alcohol is metabolised in the liver. Alcohol consumption especially in heavy drinking as seen in parties affects both the bone marrow with it attendent onsequences on the haematological parameters and also the liver resulting to drastic changes in the liver function and in the kidney and the heart.This shows that effect of alcohol is multifactorial in nature. As alcohol is used by many in pursuit of happiness and for social purposes,the consumers should take moderate quantities which could be of beneficial effect to the heart. Full blood count and liver enzymes tests should be ordered in cases of acoholic disorders.

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