

Full Length Research Paper

Assessment of Liver Function Tests among Alcoholisms in Sudan

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Abstract

Background: Alcoholism is an important health problem all over the world. Liver function tests are important tools in diagnosing alcohol abuse and identifying the stages of alcoholic liver disease. **Objective:** This study aimed to assess the liver function tests among Alcoholism in Sudan. **Materials and method:** This was cross-sectional study, which conducted in Dar El Salam, Omdurman, Khartoum state during the period from November-December 2016, 43 Alcoholic subjects were enrolled in this study, all cases were alcoholic drinkers and had no background of liver disease. Albumin (ALB), aspartate transaminase (AST), alanine transaminase (ALT), alkaline phosphatase (ALP) and gamaglutamyl transaminase (GGT) levels were measured by advanced chemistry analytical system Mindray BS200 at friendship hospital. SPSS was used to analyze the data. **Results:** The results showed that, Alcohol subjects had significantly higher AIB, AST, GGT and TP compared to normal reference value *p-value* (0.005, 0.008, 0.001, 0.008) respectively. 84% of alcoholic subjects had higher levels of AST, 23% had high levels of ALT and 81% had high levels GGT. Alcoholic subjects daily drinkers had higher levels of ALP and GGT compared to those who drink sometimes *p-value* (0.015 ,0.002) respectively. Alcoholic subjects sedately life style had higher levels of AST and GGT compared to those who had active lifestyles *p-value* (0.005, 0.001) respectively. AST, ALT, ALP and GGT were positively correlated with the quantity of alcohol consumed. Also, there were positive correlation between AST, ALT and ALP with duration of alcohol. **Conclusion:** This study concludes that, Alcoholism had significantly higher Alb, AST, GGT and TP. The quantity of alcohol consumed correlated positively with AST, ALT, ALP and GGT. Duration of alcoholic positively correlated with AST, GGT and TP.

Keywords: Alcoholism, liver, enzymes.

INTRODUCTION

Alcoholism is an important health problem all over the world. Alcohol use is rising rapidly in developing regions and is a major concern among indigenous people around the world Adak *et al.*, 2011; Walter and Mohammed, 2014. Alcohol-related problems are typically associated with medical, economic and social issues. Alcohol consumption causes many medical conditions including

liver disease, Alcohol is one of the major causes of end-stage liver disease across the world, Walter and Mohammed, 2014. Alcoholism is related to more than 60 diseases, and among them alcoholic liver disease (ALD) has the highest mortality rate Rehm *et al.*, 2013; Niemela, 2016. Moreover, the World Health Organization (WHO) estimates that there are about 2 billion people in both developing and developed countries globally who consume the different forms of alcoholic beverages Pradhan *et al.*, 2012.

Alcohol use disorders, both acute and chronic, are significant clinical problems due to their devastating health impacts and high prevalence throughout the world Das and Vasudevan, 2005. The occurrence of health problems in alcohol consumers seems to be proportional to the amount of alcohol ingested over a long period of time Sharpe, 2001. The biochemical, clinical and social effects of alcohol abuse high light the urgent need for objective and specific marker for alcohol related disease and for early detection of potential alcohol abusers. The history is the most important means for detecting alcohol misuse. The history should cover current and past alcohol intake, identify quantity and frequency of intake Sharpe, 2001; Das *et al.*, 2003.

The relapse to alcohol abuse, after de-addiction, is also as high as 35% Severity of liver damage is often correlated with the amount of alcohol consumption in patients with a history of heavy alcohol abuse Bbosa *et al.*, 2014. In addition be differentiated reliably from non-alcoholics using clinical laboratory tests. Moreover, distinguishing alcoholic from non-alcoholic liver disease has important implications for treatment and management .The most widely used tests for this purpose are standard liver function tests, glutamyl transferase (GGT) Bbosa *et al.*, 2014; Suzuki *et al.*, 2006.

Alcohol consumption is responsible for 3.8% of global mortality and 4.6% of disability-adjusted life-years (DALYs) lost due to premature death. The attributable burden in Europe, with 6.5% of all deaths and 11.6% of DALYs attributable to alcohol, is the highest proportion of total ill health and premature deaths due to alcohol of all WHO regions Alatalo *et al.*, 2008. Alcohol consumption is known to lead to accumulation of fat in hepatic tissue and to induce changes in serum liver-derived enzymes Alatalo *et al.*, 2008; Das *et al.*, 2014. Clinically, measurements of serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), and glutamyl transferase (GGT) are widely used as markers in evaluating the degree of liver injury Das *et al.*, 2014. Therefore the present study investigated changes in liver function tests enzymes parameters among alcoholic in Sudan (both daily and sometimes).

Materials and Methods

Study design

This was cross-sectional study, which conducted in Dar-Elsalam, Omdrman, Khartoum state during the period from November 2016 - December 2016.

Ethical Consideration

The study has been approved by the local ethics committee of Alneelain University. All participants in the

study were given their written informed consent, considering the aims of the study and sample and clinical information's.

Study population

A total of 43 alcoholic subjects was included in this study, All cases were alcoholic.

Sampling

A sample of 5 ml venous blood was collected from each participant at harmonized container lift from room temperature and centrifuged at 3200 rpm for three months to obtain plasma. Plasma obtained were analyzed for total protein, ALB, AST, ALT, ALP and GGT using advanced chemistry analytical system Mindray BS200 at friendship hospital.

Including and excluding criteria

The study included all Patients aged above 18 years, male gender and had a history of drinking alcohol. While the study excluded all diagnosed to have nonalcoholic liver diseases, had a history of consuming hepatotoxic drugs in the recent past, diagnosed with malaria, dengue fever and viral hepatitis which can by itself derange liver enzymes

Data analysis

The results were analyzed using the Statistical Package for Social Sciences (SPSS, version 21). Data were described using the mean, standard deviation, frequency and percentage. One sample test was used to compare mean concentrations of liver enzymes with normal reference range. Independent test was used to compare the differences of liver enzymes between daily and sometime alcoholic groups as well as Active and Sedately life style. Furthermore, the Pearson correlation test was used to evaluate the relationship between study variables and study parameters. All statistical tests were considered significant in *p-value* of <0.05 with a confidence level of 95%.

Results

A total of 43 Alcoholic subjects was included in this study. The results showed that the mean age of alcoholic subjects was (43.65±13.09) years and the mean duration of drinking alcohol was (12.44±6.36) years. The results showed that, Alcohol subjects had significantly higher Alb, AST, GGT and TP compared to normal reference value *p-value* (0.005, 0.008, 0.001, 0.008) respectively. While ALT and ALP levels were not significantly different, *p-value* 0.164, 0.635 respectively table 1.

Table 1. Mean concentration levels of enzymes among alcoholic drinkers

Parameters	Mean±SD	Normal range	P-value
Alb (g/dl)	4.48±0.43	4.10	0.005
AST (U/L)	58.72±8.93	25	0.008
ALT (U/L)	21.58±15.84	25	0.164
ALP (U/L)	86.88±32.68	84.50	0.635
GGT (U/L)	68.81±13.22	22	0.001
TP (g/dl)	8.42±0.89	7.10	0.008

Table 2. Percentage distribution of enzymes among alcoholic drinkers

Parameters	Frequency (%) High	Frequency (%) Normal	Frequency (%) Total
AST	36 (84%)	7 (16%)	43 (100%)
ALT	10 (23%)	33 (77%)	43 (100%)
GGT	35 (81%)	8 (19%)	43 (100%)

Table 3. Mean concentration level of enzymes across the rate of the drink

Parameters	Daily Mean±SD	Sometimes Mean±SD	P-value
AST (U/L)	58.83±22.55	58.50±21.71	0.987
ALT (U/L)	21.34±17.02	22.07±13.63	0.881
ALP(U/L)	90.90±27.25	78.57±18.79	0.015
GGT (U/L)	89.83±18.43	25.29±6.25	0.002
TP (g/dL)	8.58±0.83	8.09±0.94	0.106

P-value 0.05≥ consider as significant

Table 4. Mean concentration level of enzymes across the life style

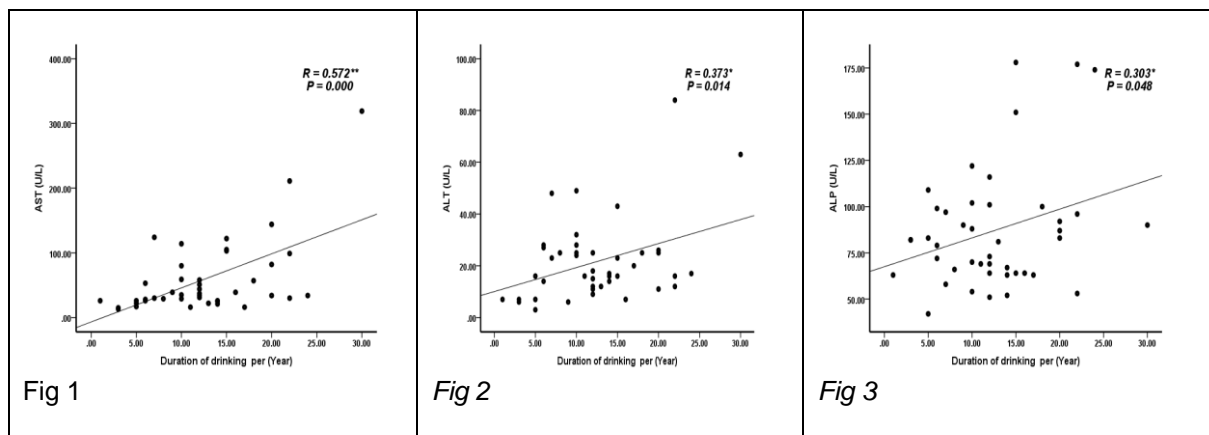
Parameters	Active Mean±SD	Sedately Mean±SD	P-value
AST (U/L)	51.08±42.1	98.00±40.55	0.005
ALT (U/L)	21.61±15.42	21.43±19.17	0.978
ALP(U/L)	85.19±31.89	95.57±37.95	0.449
GGT (U/L)	71.50±15.54	8.52±0.79	0.002
TP (g/dL)	8.52±0.79	7.90±1.22	0.237

P-value 0.05≥ consider as significant

Table 5. Correlation between quantity consumption per once and study parameters

Parameters	R-value	P-value
Alb (g/dl)	0.002	0.988
AST (U/L)	0.567**	0.000
ALT (U/L)	0.493*	0.001
ALP (U/L)	0.319	0.037
GGT (U/L)	0.664**	0.000
TP (g/dl)	0.101	0.518

P-value 0.05≥ consider as significant



Correlation between duration of alcoholic drinkers and AST, ALT and ALP. P -value $0.05 \geq$ consider as significant

The results observed that (84%) of alcoholic subjects had higher levels of the aspartate aminotransferase (AST) and (16%) normal AST. (23%) of alcoholic subjects had high levels of ALT, (77%) normal ALT. (81%) of alcoholic subjects had highly GGT levels, while (19%) normal GGT table 2. The results observed that, alcoholic subjects daily drinkers had higher levels of ALP and GGT compared to those who drink sometimes p -value 0.015 and 0.002 respectively. AST, ALT and TP levels were not significant difference in alcoholic subjects daily drinkers and sometimes drink. Table 3 alcoholic subjects sedately life style had higher levels of AST and GGT compared to those who had active lifestyle p -value 0.005 and 0.001 respectively table 4.

There was a positive correlation between the quantity of alcohol consumed per day and AST,ALT,ALP and GGT, while Alb and Tb levels showed no correlation with the quantity of alcohol consumed per day table 5. The Pearson correlation observed, there were positive relation between duration of alcohol per years and AST,ALT and ALP. Figure 1,2,3 respectively.

DISCUSSION

Serum enzymes are the most commonly used and sensitive biochemical markers for the assessment of liver disease. Alcohol is a toxin that is harmful to the liver and alcoholic liver disease and it is one of the leading causes of alcohol-related death Okonkwo *et al.*, 2012. Alcohol consumption causes changes in the liver Rehm *et al.*, 2013. Previous study by Das Bkl, Lamsal on Evaluation of Biochemical Parameter Alteration in Alcohol Dependence Ethnic Nepalese reported that the liver enzyme of AST, ALT, AST,ALT and GGT and alkaline phosphatase activities were significantly increased in alcohol dependence compared to healthily appearance Walter and Mohammed, 2014. Present Study showed that, Alcohol subjects had significantly higher Alb, AST GGT and TP compared to normal reference value, this

may have been due to different drinking pattern like drinking with food or without food. Pervious study reported that, the percentage distributions of abnormal (ALT, AST, ALP) in alcohol consumers are greater than that of non-alcohol consumers, (ALT, AST, ALP) normal levels in non-alcohol consumers are lower than those in alcohol consumers, Okonkwo *et al.*, 2012.

Accordingly earlier present study observed (84%) of alcoholism had highly levels of the aspartate aminotransferase (AST) and (16%) normal AST. (23%) of alcoholism had high levels of ALT, (77%) normal ALT. (81%) of alcoholism had highly GGT levels, while (19%) normal. This may be due to the fact that alcohol increases the levels of enzymes in the blood, an early indicator of liver injury; and might imply that alcoholics are at greater risk of developing liver damage than non-alcoholics. This is in agreement with earlier findings. The present study showed that alcoholic daily drinkers had higher levels of ALP and GGT compared to those who drink sometimes p -value 0.015 and 0.002 respectively. Pervious by Saverio Stranges and Jo L. Freudenheim reported that, the daily alcoholic drinkers had higher levels of GGT compared to sometimes drinkers Stranges *et al.*, 2004.

This finding was in agreed with the earlier present study. Pervious study on effects of alcohol consumption on Hepatocellular Injury in Japanese Men observed AST, ALT and GGT levels significantly correlated positively with alcoholic consumption Miwako *et al.*, 2004. Accordingly the present study found a positive correlation between the quantity of alcohol consumed per day and AST,ALT,ALP and GGT. Other Previous study of Walter A and Mohammed Ashraf on a study correlating the quantity and duration of alcohol consumption with liver function tests reported that, AST and GGT positively correlated with duration of alcoholic. Our present study showed AST, ALT and ALP were positively correlated with duration of alcoholics. These findings agrees with earlier present study.

CONCLUSION

The assessment of liver function test parameters among alcoholism is essential for the rational understanding of the alcohol effect on liver. This study concludes that, Alcoholism had significantly higher Alb, AST GGT and TP. The quantity of alcohol consumed correlated positively with AST, ALT, ALP and GGT. Duration of alcoholic positively correlated with positive AST, GGT and TP.

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