VOLUME-9, ISSUE-5, MAY -2020 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Forensic Science

IDENTIFICATION AND COMPARISON BETWEEN ALCOHOLIC AND NON-ALCOHOLIC GROUPS OF ALCOHOL ABUSE USING LABORATORY TEST GGT, AST, ALT AND MCV THROUGH CAGE AND AUDIT QUESTIONNAIRES

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ABSTRACT The alcoholics are identified by CAGE and AUDIT questionnaires. CAGE and AUDIT had a significant relationship with laboratory investigations in establishing case of chronic alcohol abuse. Laboratory investigations (LFT) differentiate the liver enzyme level in chronic alcohola busers from nonalcoholics. It is seen that compared to non-alcoholics, in alcoholics biomarkers (GGT, AST, ALT and MCV) were increased significantly. Increased Biomarkers were associated with alcoholism and alcoholic dependence.

In alcoholics it is seen that all biomarkers had positive correlation with AUDIT questionnaire as compared to CAGE questionnaire. There is a strong positive correlation of AUDIT questionnaire with CAGE questionnaire.

CAGE has more screening value between alcoholics and non-alcoholics while in comparison to the AUDIT which has more scoring value regarding alcohol consumption. While supplementing CAGE and AUDIT with laboratory investigation can be a predictor of alcoholism.

Another important conclusion was the liver enzyme (GGT, AST, ALT) and MCV level can be differentiated between chronic alcohol abusers and nonalcoholics. So his study supports that chronic alcohola buse can be detected using CAGE and AUDIT questionnaires and laboratory investigations.

KEYWORDS : CAGE Questionnaire ; AUDIT Questionnaire; Alcoholics Biomarkers; Alcoholic Dependence .

INTRODUCTION

The World health organization estimated that 3 million alcoholics die in year 2016, which is one in twenty deaths, is caused due to alcohol abuse and three out of four are males[1]. According to the Global status report on alcohol and health 2011(WHO) approximately 4.5% of global burden of disease and 3.8% of all deaths worldwide contributes to alcohol.[2]

Alcohol consumption among adults above 15 years is 0.6 liters per person per year, in India. In other parts of world it is 4.4 liters per person per year[3].

Use of questionnaires in screening the alcohol users:

Questionnaires with laboratory test, gives better result in detecting alcoholism. A "CAGE" (Cut, Annoyed, Guilty, Eye Opener) questionnaire was developed by EWING in 1968 at the North Carolina memorial hospital and was validated by Mayfield and his colleague in 1970 in a psychiatry hospital. "CAGE" study alone may improve the screening of alcohol related problems[4]. "CAGE" questions are small in proposition easy to administer in hospital setting and less time consuming[5].

"AUDIT" (Alcohol Use Disorder Identification Test) are useful in screening situation and can identify recent chronic alcohol patients and is more significant then CAGE in detecting chronic heavy drinkers[6]. AUDIT is used for detection of risky behavior, such as hazardous level of alcohol consumption. The efficacy of screening test can be improved by conducting laboratory test with questionnaries[7]. Many alcohol abusers are in good health and do not present with any clinical sign and symptoms. Most of them are unwilling to take medical advice and initially hide their addiction and when finally medical consultation is taken the disease has already progressed to a stage that it is too late to reverse the organ damage and alcohol dependence[8].

Biochemical markers:

For the purpose of diagnosis of alcohol abuse or dependence certain biochemical markers are used. These markers are reflection to the changes caused in the body due to heavy drinking. For diagnosis of alcohol dependence self report screening scale is used as criteria in which the following biomarkers are often found to be elevated[17].

- GGT (Gamma-glutamyl transferase) – It is a large molecule glycoprotein. GGT is made up of carbohydrate and protein. GGT helps digestion and is found in hepatocytes and billiary epithelial cells involved in bile production. In alcohol abuse there is marked rise in GGT which indicates liver disease especially with other drug abuse. GGT can been seen elevated in other disease like pancreatitis, prostate diseases[9]. GGT has sensitivity of 61% and is used clinically in USA as a biomarker of alcoholism.
- AST/ALT (Aspartate aminotransferase/Alanine aminotransferase) – These enzymes metabolize amino acids the building block of protein. AST/ALT is less sensitive for alcoholism then GGT. They are often elevated in other condition of liver disease then in alcoholic liver disease. Comparable to AST, ALT is more specific for liver injury due to alcohol because this enzyme is found in liver whereas AST can be found in other organs liver, heart, muscles, brain, kidney. AST/ALT ratio is often used as indicator of heavy alcohol consumption. Very high level of ALT /AST (e.g., 500 units per liter) is the indicator of fliver injury. ALT sensitivity is method dependent. Whereas AST sensitivity is 56% indicator of chronic alcohol abuse and is used clinically in USA as a biomarker of alcoholism[10].
- MCV (Mean corpuscular volume) – it is a volume of red blood cells. It is raised in heavy drinking. Even after abstaining for several months there is rise of marker in blood. But it can rise in other conditions also reducing

its specificity[11].

The markersusedshould have high specificity and sensitivity. It should be able to distinguish heavy alcohol consumption from social drinker as well as non alcoholic liver disease. The liver enzymes (GGT) and (MCV) have been widely used as an important marker. GGT has sensitivity of 62% for hospitalized alcoholics and 43% for ambulatory alcoholics with specificity around 66%.AST has sensitivity of only 35% while ALT has low sensitivity then AST. MCV has a sensitivity of only 50% and specificity of 90%[12].

Biochemical enzyme markers can be used for detection of alcohol abusers who take alcohol in larger quantities then the recommended levels.It has been seen that the level of enzymes like GGT, AST, ALT, MCV are highly elevated in alcoholics. Biochemical markers are useful tool for identification of hazardous alcohol intake[13].The main aim of screeningpeopleistoidentify thosewhoareheavy drinkers and to monitor their drinking habit and consequence of alcohol intake on their health. The screening makes advanced appraisal, for diagnosis and treatment planning [14].

MATERIAL AND METHODS

This study was a hospital based case control study carried out in a tertiary care hospital after receiving proper ethical committee clearance from institutional ethical committee. The total sample size of 160 (80 alcoholic and 80 non alcoholic) participated in the study. An informed written consent was obtained from every participant and they were free to withdraw their consent at any point of time. Written informed consent was taken in English and those who could not understand English, consent was taken in local language for blood investigation and questionnaires. Demographic information including age, sex and marital status was collected.The identifiable markers were replaced with unique number in the Performa. Venous blood was collected on the day of admission for liver profile (AST, ALT, and GGT) and MCV. Liver function test was performed on automatic analyzer. Patient answer to the CAGE and AUDIT questionnaires were documented.

Source of data/Sampling method

Patients with age group of 18 to 60 years from tertiary care hospital were included in the study.

Inclusion criteria

Patient admitted to tertiary care hospital with age group 18 to 60 were included in the study.

Exclusion criteria

The following patients were excluded from the study:

(1) Patients ≥ 60 years or ≤ 18 years of age.
(2) Patients with acute or chronic liver disease from any other cause.
(3) Patients on enzyme inducing medication such as anticonvulsants, antipsychotic.
(4) Patients with substance other then alcohol.

Data analysis

Data analysis was performed by SPSS (version 17) for windows.Alpha value was set as 0.05.Descriptive statistics was performed to find out mean, range, standard deviation for the demographic variable and outcome variables. Chi square test was performed to find out gender differences and marital status among both groups. Unpaired t test was used to find out significant differences among demographic variable such as age. Unpaired t test was used to find out significant differences between group for GGT, AST, ALT & MCV. Mann Whitney U test was used to find out significant differences between group for AUDIT & CAGE. Spearman correlation test was used to find out relationship of GGT, AST, ALT & MCV with CAGE & AUDIT.Chi square test was performed to find out association of increased level of biomarkers with alcoholic group. Microsoft excel, word was used to generate graph and tables.

OBSERVATIONS AND RESULTS

Statistical Analysis:

GROUP 1: ALCOHOLIC & GROUP 2: NON ALCOHOLIC

Table I:Descriptive Statistics For Demographic Variables

Sl No	Variables	Range	Minimum	Maximum	Mean	Std. Deviation
1	Age	42.00	18.00	60.00	43.16	12.63
2	GGT	1177.00	10.00	1187.00	99.00	155.94
3	AST	198.00	12.00	210.00	54.33	34.05
4	ALT	220.00	12.00	232.00	71.20	45.37
5	MCV	86.00	54.00	140.00	91.41	11.23
6	CAGE	4.00	0.00	4.00	1.56	1.58
7	AUDIT	34.00	0.00	34.00	12.91	13.59

In the present study of 160 samples, the age range was 42, minimum was18 and maximum was 60, mean 43.16 with the standard deviation 12.63. The GGT range was 1177, minimum was 10 and maximum was 1187; mean 99 with the standard deviation 155.94. The AST range was 198, minimum was 12 and maximum was 210, mean 54.33 with the standard deviation 34.05. The ALT range was 220, minimum was 12 and maximum was 232, mean 71.20 with the standard deviation 45.37. The MCV range was 86, minimum was 54 and maximum was 140, mean 91.41 with the standard deviation 11.23. The CAGE range was 4, minimum 0 and maximum was 4, mean 1.56 with the standard deviation 1.58. The AUDIT range was 34, minimum was 0 and maximum was 34; mean 12.91 with the standard deviation 13.59.

Table II: Baseline Data For Demographic Variables

Sl.No:	Variables	Group 1	Group 2	Þ-value
1	Age	44.61±10.97	41.70±14.02	>0.145
2	Gender(M/F)	80/0	69/11	<0.001
3	MARITAL STATUS(DS/M/UM)	1/67/112	2/62/16	>0.577

Data are mean ± standard deviation. In the group I, the mean age is 44.61 with standard deviation of 10.97 and in the group II, the mean age is 41.70 with standard deviation of 14.70 which was not statistically significant (Þ-value >0.145). In the group I, there were 80 males and 0 females and in the group II, there were 69 males and 11 females which were statistically significant (Þ-value <0.001). In the group I, there were 1 DS, 67 M and 12 UM and in the group II, there were 2 DS, 62 M and 16 UM which were statistically significant (Þ-value > 0.577).

Table III: Difference between groups alcoholic and non-alcoholic

Sl.No:	Variables	Group 1	Group 2	Þ-value
1	GGT	158.49±203.79	39.51±15.54	<0.0001
2	AST	75.05±33.81	33.60±17.88	<0.0001
3	ALT	101.59±44.23	40.81±17.78	<0.0001
4	MCV	93.85±14.47	88.98±5.70	<0.006
5	CAGE	3.11±0.32	0.00±0.00	<0.0001
6	AUDIT	26.05±5.71	0.00±0.00	<0.0001

In the group I(Alcoholics), the mean GGT was 158.49 with standard deviation of 203.79 and in the group II(Non-Alcoholics), the mean GGT is 39.51 with standard deviation of 15.54 which was statistically significant (Þ-value <0.0001). In the group I, the mean AST is 75.05 with standard deviation of 33.81 and in the group II, the mean AST is 33.60 with standard deviation of 17.88 which was statistically significant ((Þ-value <0.0001). In the group I, the mean ALT

was 101.59 with standard deviation of 44.23 and in the group II, the mean ALT is 40.81 with standard deviation of 17.78 which was statistically significant (Þ-value <0.0001). In the group I, the mean MCV was 93.85 with standard deviation of 14.47 and in the group II, the mean MCV is 88.98 with standard deviation of 5.70 which was statistically significant (Þ-value <0.006). In the group I, the mean CAGE is 3.11 with standard deviation of 0.32 and in the group II, the mean CAGE is 0 with standard deviation of 0 which was statistically significant (Þ-value <0.0001). In the group I, the mean AUDIT is 26.05 with standard deviation of 5.71 and in the group II, the mean AUDIT is 0 with standard deviation of 0 which was statistically significant (Þ-value <0.0001).

Table 4: Correlation of biomarkers with questionnaires in all subjects (160 samples)

Sl No	Variables	Correlation/ significance	AUDIT	CAGE
1	GGT	Correlation Coefficient	.491**	.480**
		Sig. (2-tailed)	.0001	.0001
2	AST	Correlation Coefficient	.596**	.566**
		Sig. (2-tailed)	.0001	.0001
3	ALT	Correlation Coefficient	.676**	.658**
		Sig. (2-tailed)	.0001	.0001
4	MCV	Correlation Coefficient	.269**	.229**
		Sig. (2-tailed)	.001	.004

** represents significance at <.01

In the above table there was statistically significant correlation of all biomarkers with both questionnaires which was statistically significant (p<0.01) with coefficient ranging from. 229 to .596. So a further correlation analysis was done only for alcoholics which was analyzed below table. Correlation analysis of AUDIT with CAGE showed that. 923 which was statistically significant (p<0 .0001).

Table 5: Correlation of GGT, AST, ALT, MCV with CAGE and AUDIT in Alcoholic Group

Sl.No:	Variable	Correlation Coefficient/ Sig.	CAGE	AUDIT
1	GGT	Correlation Coefficient	.194	.338**
		Sig. (2-tailed)	.084	.002
2	AST	Correlation Coefficient	.131	.243*
		Sig. (2-tailed)	.246	.030
3	ALT	Correlation Coefficient	.104	.297**
		Sig. (2-tailed)	.360	.007
4	MCV	Correlation Coefficient	.063	.311**
		Sig. (2-tailed)	.581	.005

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The above table represents the Correlation Coefficient and p-value of bio markers with CAGE and AUDIT. The GGT correlation coefficient with CAGE was 0.194 which was not statistically significant (p-value >0.084); AUDIT was 0.338 which was statistically significant (p-value was <0.002). The AST correlation coefficient with CAGE was 0.131 which was not statistically significant (p-value >0.246); AUDIT was 0.030 which was statistically significant (p-value was >0.297). The ALT correlation coefficient with CAGE was 0.104 which was not statistically significant (p-value >0.360); AUDIT was 0.297 which was statistically significant (p-value was <0.007). The MCV correlation coefficient with CAGE was 0.063 which was not statistically significant (p-value >0.581); AUDIT was 0.311 which was statistically significant (p-value was <0.005).

Fig : Scatter diagram of AST GGT ALT and MCV with AUDIT

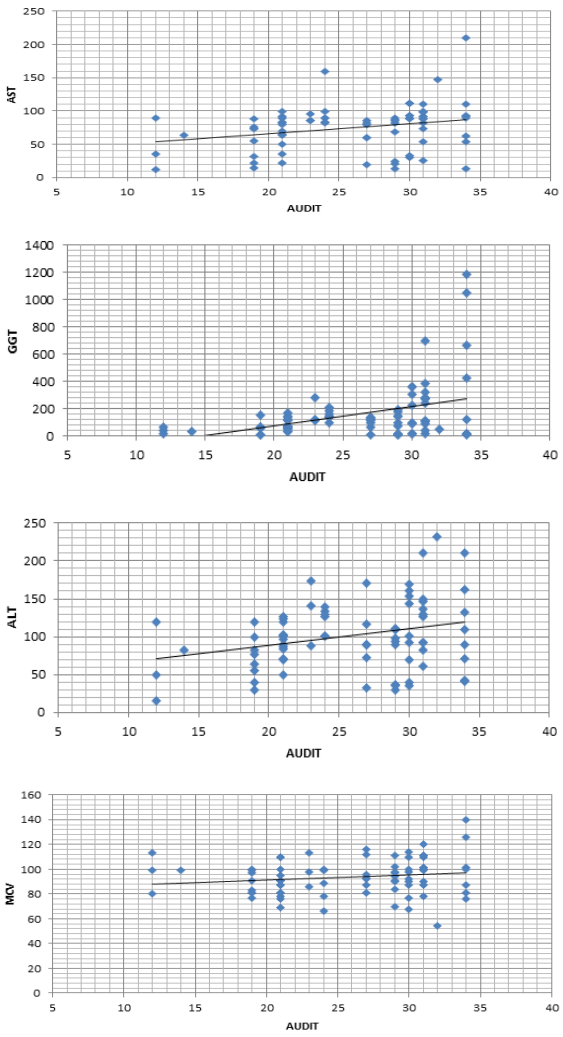

Table VI: Association of GGT with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
GGT	≤73	Frequency	33	79	112	62.976	<0.0001
		Percentage	41.3%	98.8%	70.0%		
	>73	Frequency	47	1	48		
		Percentage	58.8%	1.3%	30.0%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

In the above table, cross tabulation was done for GGT (increased and normal range) with alcoholic group verses non alcoholic group showed that increased GGT subject were more in alcoholic group which was statistically significant.

Table VII: Association of AST with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
AST	≤40	Frequency	16	71	87	76.208	<0.0001
		Percentage	20.0%	88.8%	54.4%		
	>40	Frequency	64	9	73		

		Percentage	80.0%	11.3%	45.6%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

Table VIII: Association of ALT with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
ALT	≤50	Frequency	13	66	79	70.236	<0.0001
		Percentage	16.3%	82.5%	49.4%		
	>50	Frequency	67	14	81		
		Percentage	83.8%	17.5%	50.6%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

In the VI table, cross tabulation was done for GGT (increased and normal range) with alcoholic group verses non alcoholic group showed that increased GGT subject were more in alcoholic group which was statistically significant.

In the VII table, cross tabulation was done for AST

Table IX: Association MCV with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
MCV	≤100	Frequency	60	80	140	22.857	<0.0001
		Percentage	75.0%	100.0%	87.5%		
	>100	Frequency	20	0	20		
		Percentage	25.0%	0.0%	12.5%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

(increased and normal range) with alcoholic group verses non alcoholic group showed that increased AST subject were more in alcoholic group which was statistically significant.

In the VIII table, cross tabulation was done for ALT

Table X: Association CAGE with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
CAGE	≤2	Frequency	0	80	80	160.000	<0.0001
		Percentage	0%	100.0%	50.0%		
	>3	Frequency	80	0	80		
		Percentage	100.0%	0.0%	50.0%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

(increased and normal range) with alcoholic group verses non alcoholic group showed that increased ALT subject were more in alcoholic group which was statistically significant.

In the above table, cross tabulation was done for MCV (increased and normal range) with alcoholic group verses non alcoholic group showed that increased MCV subject

Table XI: Association AUDIT with alcoholism

Variable	Value	Frequency/Percentage	Alcoholic	Non-alcoholic	Total	Chi-square	Þ-value
AUDIT	Zone I	Frequency	0	80	80	160.00	<0.0001
		Percentage	.0%	100.0%	50.0%		
	Zone II	Frequency	4	0	4		
		Percentage	5.0%	.0%	2.5%		
	Zone III	Frequency	8	0	9		
		Percentage	10%	.0%	5.6%		
	Zone IV	Frequency	68	0	67		
		Percentage	83.8%	.0%	41.9%		
Total		Frequency	80	80	160		
		Percentage	100.0%	100.0%	100.0%		

were more in alcoholic group which was statistically significant.

In the above table, cross tabulation was done for CAGE

Table XII: Association of GGT with AUDIT

Variable	Value	Freq/Expe/Percentage	Zone I	Zone II	Zone III	Zone IV	Total	Chi-square	Þ-value
GGT	≤73	Frequency	79	4	7	22	112	82.263	<0.0001
		Expected Count	56.0	2.8	5.6	47.6	112.0		
		Percentage	98.8%	100.0%	87.5%	32.4%	70.0%		
	>73	Frequency	1	0	1	46	48		
		Expected Count	24.0	1.2	2.7	20.1	48.0		
		Percentage	1.3%	.0%	12.5%	67.6%	30.0%		
Total		Frequency	80	4	8	68	160		
		Expected Count	80.0	4.0	8.0	67.0	160.0		
		Percentage	100.0%	100.0%	100.0%	100.0%	100.0%		

(increased and normal range) with alcoholic group verses non alcoholic group showed that all increased CAGE subjects were more in alcoholic group which was statistically significant.

In the above table, cross tabulation was done for AUDIT

Table XIII: Association of AST with AUDIT

Variable	Value	Freq/Expe/Percentage	Zone I	Zone II	Zone III	Zone IV	Total	Chi-square	Þ-value
AST	≤40	Frequency	71	2	3	11	87	79.048	<0.0001
		Expected Count	43.5	2.2	4.4	37.0	87.0		
		Percentage	88.8%	50.0%	37.5%	16.2%	54.4%		
	>40	Frequency	9	2	5	57	73		
		Expected Count	36.5	1.8	3.7	31.0	73.0		
		Percentage	11.3%	50.0%	62.5%	83.8%	45.6%		
Total		Frequency	80	4	8	67	160		
		Expected Count	80.0	4.0	8.0	67.0	160.0		
		Percentage	100.0%	100.0%	100.0%	100.0%	100.0%		

(Zone I to IV) with alcoholic group verses non alcoholic group showed that increased AUDIT subjects were more in alcoholic group which was statistically significant.

Table XIV: Association of ALT with AUDIT

Variable	Value	Freq/Expe/Percentage	Zone I	Zone II	Zone III	Zone IV	Total	Chi-square	Þ-value
ALT	≤50	Frequency	66	2	2	9	79	72.551	<0.0001
		Expected Count	39.5	2.0	4.0	33.6	79.0		
		Percentage	82.5%	50.0%	25.0%	13.2%	49.4%		
	>50	Frequency	14	2	6	59	81		
		Expected Count	40.5	2.0	4.1	34.4	81.0		
		Percentage	17.5%	50.0%	75.0%	86.8%	50.6%		
Total		Frequency	80	4	8	67	160		
		Expected Count	80.0	4.0	8.0	67.0	160.0		
		Percentage	100.0%	100.0%	100.0%	100.0%	100.0%		

were more in zone IVAUDIT group which was statistically significant.

Variable	Value	Freq/Expe/Percentage	Zone I	Zone II	Zone III	Zone IV	Total	Chi-square	Þ-value
MCV	≤73	Frequency	80	3	8	49	140	27.966	<0.0001
		Expected Count	70.0	3.5	7.0	59.5	140.0		
		Percentage	100.0%	75.0%	100.0%	72.1%	87.5%		
	>73	Frequency	0	1	0	19	20		
		Expected Count	10.0	.5	1.1	8.4	20.0		
		Percentage	.0%	25.0%	.0%	28.4%	12.5%		
Total		Frequency	80	4	8	67	160		
		Expected Count	80.0	4.0	8.0	67.0	160.0		
		Percentage	100.0%	100.0%	100.0%	100.0%	100.0%		

In the above table, cross tabulation was done for GGT (increased and normal range) with alcoholic group verses non alcoholic group showed that increased GGT subject were more in AUDIT group which was statistically significant.

In the above table, cross tabulation was done for AST (increased and normal range) with alcoholic group verses non alcoholic group showed that increased AST subject were more in Zone IV AUDIT group which was statistically significant.

In the above table, cross tabulation was done for ALT (increased and normal range) with alcoholic group verses non alcoholic group showed that increased ALT subject were more in AUDIT group which was statistically significant.

In the above table, cross tabulation was done for MCV (increased and normal range) with alcoholic group verses non alcoholic group showed that increased MCV subject were more in AUDIT group.

DISCUSSION

Table 16: Various studies conducted in different regions in relation to alcohol consumption and detection by questionnaire and Laboratory biomarkers.

Authors	Region	Participants	Finding of the given study	Finding of the present study
Gogoi J B et al, 2018	Garhwal Hills, India.	150 participants, mean age 41 years.	After answering the questionnaire regarding alcohol intake blood samples were collected for analyses of Serum bilirubin, serum albumin, AST, ALT, GGT, serum true protein.Liver function test was deranged for 120 participants and they were suffering from alcohol related problems prone to develop liver disease[15].	In present study 160 participants were included of mean age group 42 years. CAGE and AUDIT questionnaire was effective in identifying alcoholics.In alcoholic group GGT, AST, ALT was significantly increased.The findings in the present study were similar with the study by Gogoi J B et al[15].Serum bilirubin, serum albumin, serum true protein were not analyzed in the present study.
Das A et al, 2017	Assam, India.	200 participants (100alcoholic and 100 non alcoholic) age 17 to 59 years.	It was found that GGT and MCV were raised significantly in alcoholics as compared to non alcoholic group[16].	In present study 160 participants were included of age group 18 to 60 years (80 alcoholic and 80 non-alcoholic) in alcoholic group GGT, MCV were significantly increased as compared to non alcoholic group. The findings in the present study were similar with the study by Das A et al[16].

Browne A L et al, 2013	Australia	538 Participants age group 18 to 70 years	"AUDIT" questionnaire were administered, blood samples were collected for investigation .GGT, AST, ALT, CDT, MCV blood levels of enzymes were found raised.	In present study 160 participants were included of age group 18 to 60 years (80 alcoholic and 80 non-alcoholics) in alcoholic group there is positive correlation between AUDIT and enzymes GGT, AST, ALT MCV. Blood levels of enzymes were found raised. In present study CDT marker was not analyzed.Other findings in the present study were similar with the study by Browne A L et al[17].
Lee DH et al, 2001.	Dusan North Korea.	6846 males of age group 25 to50 years.	Blood samples were collected for ALT, AST, and GGT in both alcoholic and non alcoholic participants and it was seen that there was deranged enzymes levels and change in BMI of participants with alcohol consumption[18].	In present study 160 participants were included of age group 18 to 60 years (80 alcoholic and 80 non-alcoholics). Blood samples were collected for ALT, AST, and GGT in both alcoholic and non alcoholic participants and it was seen that there was deranged enzymes levels. The findings in the present study are similar with the study by Lee DH et al[18].Our method differed from the study done by Lee DH et al[18] because BMIof participants was not recorded in the present study.
Piccinelli M et al (1997).	*Verona, north eastern Italy.*	*500 individuals belonging to age 18 to 65 years.*	*Alcohol Use Disorder Identification Test (AUDIT) was conducted. It was found to be sensitive, specific for identifying alcohol abuse[19].*	In present study 160 participants were included of age group 18 to 60 years (80 alcoholic and 80 non-alcoholics). AUDIT questionnaire was sensitive and specific for identifying alcohol abuse. The findings in the present study were similar with the study by *Piccinelli M et al[19].*

CONCLUSION

The alcoholics are identified by CAGE and AUDIT questionnaires. CAGE and AUDIT had a significant relationship with laboratory investigations in establishing case of chronic alcohol abuse. Laboratory investigations (LFT) differentiate the liver enzyme level in chronic alcohol abusers from non alcoholics. It is seen that compared to non-alcoholics, in alcoholics biomarkers (GGT, AST, ALT and MCV) were increased significantly. Increased Biomarkers were associated with alcoholism and alcoholic dependence.

In alcoholics it is seen that all biomarkers had positive correlation with AUDIT questionnaire as compared to CAGE questionnaire. There is a strong positive correlation of AUDIT questionnaire with CAGE questionnaire.

CAGE has more screening value between alcoholics and non-alcoholics while in comparison to the AUDIT which has more scoring value regarding alcohol consumption. While supplementing CAGE and AUDIT with laboratory investigation can be a predictor of alcoholism.

Another important conclusion was the liver enzyme (GGT, AST, ALT) and MCV level can be differentiated between chronic alcohol abusers and non alcoholics. So this study supports that chronic alcohol abuse can be detected using CAGE and AUDIT questionnaires and laboratory investigations.

Once chronic alcohol abusers are identified, they can be advised for rehabilitation. The change in liver biomarkers showed an increase in values in initial stage and decrease in later stage indicating liver damage in alcohol abuse people and decrease quality of life. There should be more research on large sample size on diverse population to establish the prognostic value of biomarkers, their correlation with CAGE and AUDIT questionnaire and utilization of result in public health programs.

Conflict of Interest

None declared.

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