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Original Research Article

# Effect of alcohol consumption on lipid profile

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ABSTRACT

**Background:** Now-a-days alcoholism is major complication for development of different diseases. According to our literature review chronic alcoholic consumption will cause the lot of health complications. People without any comorbidities are also diagnosed with the lot of health complications at early age because of alcohol consumption. Our aim of the study is to identify the lipid changes in chronic alcoholic patients and how it effects on their health.

**Aim:** To monitor the lipid changes in alcoholic persons.

**Materials and Methods:** A prospective observational study was conducted for duration of six months, the data has been collected in 456 patients over six months of period and the data was collected with informed consent from the persons. All the data was collected by interacting with persons by using data collection form and laboratory reports were studied.

**Results:** In our study, 456 male populations were included. Out of 456 members, 272 people were alcoholics, and 184 members were non-alcoholic. Out of 272 population 180 are chronic alcoholics and 92 are occasional alcoholics. Out of 456 members young adults (18-25) 182 (39.9%) persons and old adults (26-40) were 274 (60%) persons296 members are taking alcohol with food and 160 members are taking without food. Out of 456 population 438 (96%) persons are non-vegetarians and 18(4%) members are vegetarians. Out of 272, 104 members were drinking beer, 58 were cheap liquor, 25 were Officers' choice, 18 were royal stag, 22 were blenders pride, 15 were signature, 23 were mixed brands, and 7 were others. In our study 156 persons were drinking sweetened beverages, 52(33.3%) members are daily beverage intakes and 104(33.3%) Members are occasionally beverage intakes. According to our study most commonly used sugary beverage brands are thumps up 93(59%), 48(31%) Sting,15(10%) other sugary beverages. Out of 156, Triglycerides were elevated in 47 and LDL was elevated in 36 persons, VLDL elevated in 4 persons and T. Cholesterol elevated in 5 members, Normal lipid profile in 64 persons. Out of 456 persons, 314(69%) are undiagnosed and 142(31%) are diagnosed with lipid changes. According to our common complications associated with alcohol consumption 39 were cardiac, 56 were hepatic, 9 were renal, and 38 were others (pancreatitis, stroke, cholelithiasis).

**Conclusion:** In our study, we concluded that alcohol consumption will mainly affect triglyceride levels. Elevation of triglyceride levels is associated with the quantity and duration of alcohol intake. Normal Intake of alcohol does not cause lipid changes. Excessive intake of beer and cheap liquor increases TG. Excessive alcohol intake and fat intake will increase the LDL, Triglycerides, VLDL and decrease HDL. Excessive intake of sweetened beverages may also cause dyslipidaemia. Because it contains a high number of calories. The most common complication associated with elevation of triglycerides are hypertension, cardiovascular disease. Alcohol intake with food or without food shows the same complications but the absorption of alcohol may vary with food. Alcohol consumption with fat intake will cause hyperlipidaemia.



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## 1. Introduction

### 1.1. Alcohol disorder

Alcohol disorder is also known as alcoholism, alcohol addiction, or alcohol dependence. It is a chronic disease that is characterized by the inability to control drinking and causes emotional distress.

### 1.2. Causes

Causes of alcohol include both internal and external components. Internal components include genetics, psychological conditions, drinking history, and personal choice. External elements that incorporate age, environment, family, religion, social, job status, and cultural norms.

### 1.3. Risk factors

Use of alcohol may begin in adulthood but alcohol disorder occurs at the age of 20s and 30s.Some of the risk factors may include- overtime drinking, drinking at an early age, genetic history, history of emotional trauma, and social factors.

### 1.4. Complications

Use of alcohol which depresses the CNS most people may experience increased energy but if they continue to drink, they experience drowsiness and less control. Some people may experience drinking too much alcohol which affects the speech and muscle coordination of your brain. Overconsumption of alcohol may cause a life-threatening condition like coma or death.

#### 1.4.1. Effect on health

Extreme drinking on occasion or over time may lead to unwanted health problems including – Liver disease, Gastric problems, Heart problems, Diabetes, Eye problems, Neurological defects, Immune system weakness, Chances of cancer, and Psychiatric complications.

### 1.5. Alcohol metabolism

Alcohol is metabolized by several pathways or processes. The most common of these pathways involves two enzymes one is alcohol dehydrogenase (ADH) and the other one is aldehyde dehydrogenase (ALDH). Both these enzymes help to break the alcohol molecule by making it possible to eliminate it from the human body. Firstly alcohol dehydrogenase metabolizes alcohol to acetaldehyde which is a highly toxic substance and known carcinogen, then the less active product formed by metabolization of acetaldehyde known as acetate which is broken down into carbon dioxide and water for further easy elimination.

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Other enzymes include cytochrome P450 2E1 (CYP2E1) and catalyse which helps in the breakdown of alcohol to acetaldehyde. However, if a person has consumed a large amount of alcohol the enzyme CYP2E1 is going to be active and a small fraction of alcohol in the person's body is metabolized by the process catalyse. Some of the alcohol can be removed by interacting with fatty acids that may form compounds like FAEES known as fatty acid ethyl esters, from this, the compounds are going to contribute to the damage to the liver and pancreas by intake of large amounts of alcohol.

#### 1.5.1. Effect of alcohol on plasma lipids

Alcohol is used to intensify the concentration of hepatic triglycerides. This is due to increased levels of triglycerides in the liver. Effects of alcohol mainly have 3 components that three components of action on plasma triglycerides:1. consumption of alcohol quantity 2. The management of diet 3. genetic predisposition. consumption of very large quantities of alcohol leads to increasing plasma levels of triglycerides in the body. Consumption of smaller quantities of alcohol like occasional drinking within the social boundaries. The outcome will be hypertriglyceridemic in an individual with type-4 hypoproteinemia but not in healthy persons(1-3)based on body weight and the amount of alcohol consumption will be varied in levels of triglycerides. Alcohol consumption by obese patients will have increased levels of triglycerides and VLDL depending on their body weight. A previous epidemiological study advised that alcohol consumption will increase plasma HDL-cholesterol outcome was cleared in experimental animals. Whereas the LDL report shows the opposite connection between alcohol consumption and plasma LDL. This may suggest that alcohol reduces LDL but in our study, there is no such reaction was seen.

### 1.6. Triglycerides

Triglycerides are a type of fat in the blood when you eat your body takes some of the calories which are not needed and turns into triglycerides and stored in fat cells. Triglycerides are apart from other lipid types or fats found in the blood. Another type in the blood is more common cholesterol.

Increased triglyceride levels may cause higher chances of alcohol stroke and also cause pancreatitis. [1]

#### 1.6.1. Realation ship betwwen alcohol and triglycerides

The body breaks down alcohol into cholesterol and triglycerides in the liver after consumption of alcohol this process may lead to more triglyceride levels in the blood.

If triglyceride levels more than they can buildup in the liver it leads to fatty liver disease. This fatty liver disease may lead to more health problems including heart disease, diabetes, liver problems and pancreatitis. [1]

#### *1.6.2. How alcohol may increase your triglyceride levels*

If a person drinks alcohol the person's bloodstream may absorb it through the person's stomach and the small intestine liver breaks the alcohol and processes it, it can be eliminated from the person's body.

The person may experience liver damage and negative heart effects by drinking too much alcohol over a long period.

Alcohol consumption may lead to increased triglyceride levels, especially beer and liquor can raise the triglyceride levels.

Extreme drinking may lead to an increase in cholesterol which is a more common cause that leads to pancreatitis and diabetes. [1]

#### *1.6.3. Effect of alcohol on sweetened beverages and triglycerides*

Triglycerides are a type of fat found in the bloodstream and high levels of triglycerides can increase your risk of heart disease.

Certain types of alcohol such as sweet cocktails and mixed drinks can be high in calories and contribute to weight gain and high triglycerides.

Alcohol can contribute to high triglycerides in several ways. certain beverages contain calories and when we consume more calories than our body needs, our body converts these excess calories into triglycerides and stores them into fat cells, this can lead to weight gain and higher triglyceride levels. Alcohol can interfere with a liver's ability to process triglycerides. when the liver is busy processing alcohol it may not be able to effectively remove excess triglycerides from the bloodstream leading to higher levels. [2,3]

### *1.7. Effect of alcohol on lipid metabolism*

Alcohol may disturb the balance of lipid metabolism in a few days in a healthy scenario liver is manageable for maintaining levels of different types of fat in the body including triglycerides and cholesterol which regulate the production, storage and release of fats based on body needs. Alcohol may interfere with this balance and stimulate the liver to produce a lot of triglycerides. Alcohol may also alter the labels of cholesterol in the body. Overconsumption of alcohol may increase LDL or bad cholesterol which leads to heart disease. Another way alcohol affects lipid metabolism is by decreasing the body's activity to break down and remove fats which leads to the accumulation of fat in the liver and this condition is known as fatty acid liver.

### *1.8. Effect of Alcohol With Food and Without Food*

Heavy consumption of alcohol with high fat intake leads to an increase in total cholesterol, triglycerides and VLDL. Moderate consumption of alcohol with fat intake leads to increased HDL and decreased LDL. Alcohol is almost all is rapidly rivet by the small intestine. The protracted alcohol remains in the stomach, the deliberatly it is occupied and the moderately it affects the body. Food prevents alcohol from passage rapidly into your small intestine. When you drink alcohol on an empty stomach much alcohol passes rapidly from the stomach into the small intestine, where most of it is engrossed into the bloodstream, this intensifies all the side effects.

## 2. Materials and Methods

The study has been conducted in medical camps, Bhageerath cardaiac care center, ,Ekashilaa hospitals, hanamkonda. A prospective observational study conducted within the period of six months. Study includes only males between the age group 20 to 40 years, alcoholics and non-alcoholics. Exclusion criteria include children, pregnant women, females, smokers and patients with comorbidities. The data collection form includes persons demographic details, past history, alcohol history-alcohol brand, quantity, duration, non-alcoholic(beverages), family history, diet, lipid profile changes, economical status, alcohol awarness. The data was collected throughout six months from medical camps, Bhageerath cardaiac care center, Ekashilaa hospitalsanalysed and interpreted through microsoft excel.

## 3. Results

**Table 1:** In Above figure there are272 (59.6%) persons are alcoholics and 184 (40.3%) persons are non-alcoholics.

| Total population | Alcoholics | Non-alcoholics |
|---|---|---|
| | 272 | 184 |

**Table 2:** Inabove figure, 184 persons are non-alcoholics in that 85% are with beverages and 15% are without beverages intake persons.

| Non alcoholics | With beverages | Without beverages intake |
|---|---|---|
| Out of 184 persons | 156 | 28 |

**Table 3:** In above figure, 66% of persons are chronic alcoholics and 34% persons are occasional alcoholics.

| Types of alchololics | Chronic alcoholics | Occasional alcoholics |
|---|---|---|
| Out of 272 | 180 | 92 |

Most commonly used sugary beverage brands 93(59%) persons are consuming Thumsup, 8(31%) persons are

**Table 4:** The causes of alcohol intake are career factors 95, age and educational factors 88, Environmental factors 27, drinking history factors 44, and psychological factors 18.

| Causes of alcohol intake | Carrer factors | Age and educational factors | Drinking history factor | Environmental factors | Psychological factors |
|---|---|---|---|---|---|
| | 95 | 88 | 44 | 27 | 18 |

**Table 5:** In above figure, 182 (39.9%) persons were young adults (18-25 years) And 274(60%) persons were old adults (26-40 years).

| Age wise distribution | Old adults | Young adults |
|---|---|---|
| Out of 456 | 274 | 182 |

**Table 6:** In above figure, 296(64.9%) persons are taking alcohol without food and 160(35%) persons are taking alcohol with food.

| Tntake of alcohol | With food | Without food |
|---|---|---|
| Out of 456 | 296 | 160 |

**Table 7:** Out of 296 persons, with fat food 192, without fat food were104.

| Fatty food | With fatty food | Without of fatty food |
|---|---|---|
| Out of 296 | 192 | 104 |

**Table 8:** The most commonly used alcohol brands are, 104(38.2%) persons are consuming beer, 58(21.3%) persons are consuming cheap liquor, 25(9%) persons are consuming the officer's choice, 18(6.6%) persons are consuming royal stag, 22(8%) persons are consuming blender's pride, 15(5.5%) persons are consuming signature, 23(8.4%) persons are consuming mixed brands 7(2.5%) persons are consuming other brands.

| Alcohol brands | Others | mixed | royalstag | beer | Blenders pride | signature | Officer choice | Cheap liquour |
|---|---|---|---|---|---|---|---|---|
| | 7 | 23 | 18 | 104 | 22 | 15 | 25 | 58 |

**Table 9:** In our study, we found these lipid changes in chronic alcoholic persons in that TG was elevated in 156 (57.3%) persons, LDL was elevated in 4(1.4%) persons, VLDL was elevated in 8(2.94%) persons, TOTAL CHOLESTEROL was elevated in 12(4.4%) persons.

| Lipid level changes in chronic alcoholics | Triglycerides | LDL | VLDL | Total cholesterol |
|---|---|---|---|---|
| Out of 180 persons | 156 | 4 | 8 | 12 |

**Table 10:** In above figure, 104 (66.6%) are daily beverage intake persons and 52(33.3%) are occasional beverage intake persons.

| B everages intake | Daily intake | Occasionally |
|---|---|---|
| Out of 156 | 52 | 104 |

**Table 11:**

| Brands of sugary beverages | Thumpsup | sting | others |
|---|---|---|---|
| Out of 156 | 93 | 48 | 15 |

consuming sting, 15(10%) persons are consuming other sugary beverages.

**Table 12:** In above figure TG was elevated in 47 (30%) persons, LDL was elevated in 36 (26%) persons, VLDL was elevated in 4(2.5%) persons, T. CHOL was elevated in 5(3.2%) persons, normal lipid profile in 64(41%) persons.

| Lipid changes in sugary beverages intake | normal | Total cholesterol | VLDL | LDL | TG |
|---|---|---|---|---|---|
| Out of 156 | 64 | 5 | 4 | 36 | 47 |

**Table 13:** In above figure, complications associated with alcohol intake are 39(25%) persons are with cardiac, 56(35.8%) persons are with hepatic, 9(5.7%) persons are with Renal, and 38(24.3%) persons are with others (pancreatitis, cholelithiasis, stroke).

| Complications of alcohol intake | others | renal | hepatic | cardiac |
|---|---|---|---|---|
| 142 | 38 | 9 | 56 | 39 |

**Table 14:** In above figure, 31% of persons are diagnosed and 69% of persons are undiagnosed.

| Diagnosed in hospital | Diagnosed | Un diagnosed |
|---|---|---|
| 456 | 142 | 314 |

**Table 15:** Economical of our population 28% are poor, 15% are moderate and 261(57%) are High.

| Economical status | poor | moderate | high |
|---|---|---|---|
| | 128 | 261 | 67 |

**Table 16:** In above figure, 78 persons are aware of alcohol intake Complications and 358 persons are not aware of alcohol intake complications.

| Awareness of alcohol intake complications | Awareness | Un awareness |
|---|---|---|
| 456 | 78 | 358 |

## 4. Discussion

In our study, 456 male populations were included. Out of 456 members, 272 people were alcoholics, and 184

members were non-alcoholic. Out of 272 population 180 are chronic alcoholics and 92 are occasional alcoholics. Out of 456 members young adults (18-25) 182 (39.9%) persons and old adults (26-40) were 274 (60%) persons. 296 members are taking alcohol with food and 160 members are taking without food. According to some studies, alcohol absorption will be delayed with food and the concentration of alcohol in the blood will decrease. According to our study with food and without food, people are experiencing the same complications. Persons who are taking alcohol with high-fat food intake will increase hyperlipidaemia. In our study 192 were taken with fat food and 104 with normal food. Based on our study Alcohol with fat intake people are diagnosed with Hyperlipidaemia. Out of 456 population 438 (96%) persons are non-vegetarians and 18(4%) members are vegetarians. In our study lipid profile changes can be mostly seen in non-vegetarians with alcohol intake.

In our study, most of the people are drinking beer and cheap liquor when compared to other brands. Out of 272, 104 members were drinking beer, 58 were cheap liquor, 25 were Officers' choice, 18 were royal stag, 22 were blenders pride, 15 were signature, 23 were mixed brands, and 7 were others. According to our study beer and cheap liquor will increase TG levels. In alcoholic beverage intake, hyperlipidaemia depends upon the quantity of alcohol consumption. According to some studies, sugary beverage intake will cause lipid changes because it contains a high number of calories. In our study 156 persons were drinking sweetened beverages, 52(33.3%) members are daily beverage intakes and 104(33.3%) Members are occasionally beverage intakes. according to our study most commonly used sugary beverage brands are thumps up 93(59%), 48(31%) Sting,15(10%) other sugary beverages. Alcohol promotes the accumulation of fat in the liver mainly by substitution of ethanol for fatty acids. The degree of lipid accumulation depends on the supply of dietary fat intake. Accumulated fatty acids Converted into triglycerides, phospholipids and cholesterol and results in hyperlipidaemia. Out of 156, Triglycerides were elevated in 47 and LDL was elevated in 36 persons, VLDL elevated in 4 persons and T. Cholesterol elevated in 5 members, Normal lipid profile in 64 persons. Based on our study intake of sugary beverages will cause or elevate the lipid changes. According to our study, most of the alcoholic persons are undiagnosed. Because of a lack of knowledge of alcoholic intake complications. Out of 456 persons, 314(69%) are undiagnosed and 142(31%) are diagnosed with lipid changes. Economic status is not related to alcohol consumption. According to our common complications associated with alcohol consumption 39 were cardiac, 56 were hepatic, 9 were renal, and 38 were others (pancreatitis, stroke, cholelithiasis).

## 5. Conclusion

In our study, we concluded that alcohol consumption will mainly affect triglyceride levels. Elevation of triglyceride levels is associated with the quantity and duration of alcohol intake. Normal Intake of alcohol does not cause lipid changes. According to our study, excessive intake of beer and cheap liquor increases TG. Excessive alcohol intake and fat intake will increase the LDL, Triglycerides, VLDL and decrease HDL. Excessive intake of sweetened beverages may also cause dyslipidaemia. Because it contains a high number of calories. The most common complication associated with elevation of triglycerides or hypertension, cardiovascular disease. Alcohol intake with food or without food shows the same complications but the absorption of alcohol may vary with food. Alcohol consumption with fat intake will cause hyperlipidaemia.

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## 7. Conflict of Interest

None.

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