

CROSS-SECTIONAL SURVEY ON EFFECT OF ALCOHOL ON BLOOD PRESSURE

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ABSTRACT

Background: Alcohol abuse is a frequent contributor to elevated blood pressure and may be the most common cause of secondary hypertension. In most cases, the blood pressure elevations are reversible and return to normal upon discontinuation of alcohol use. In this questionnaire based cross-sectional study we aimed to identify the association between alcohol consumption and blood pressure changes.

Objective: The main aim of this study is;

- ❖ To determine the effect of alcohol on blood pressure
- ❖ To create awareness among people about complications of regular alcohol consumption
- ❖ To determine the highest range of blood pressure in alcoholic population

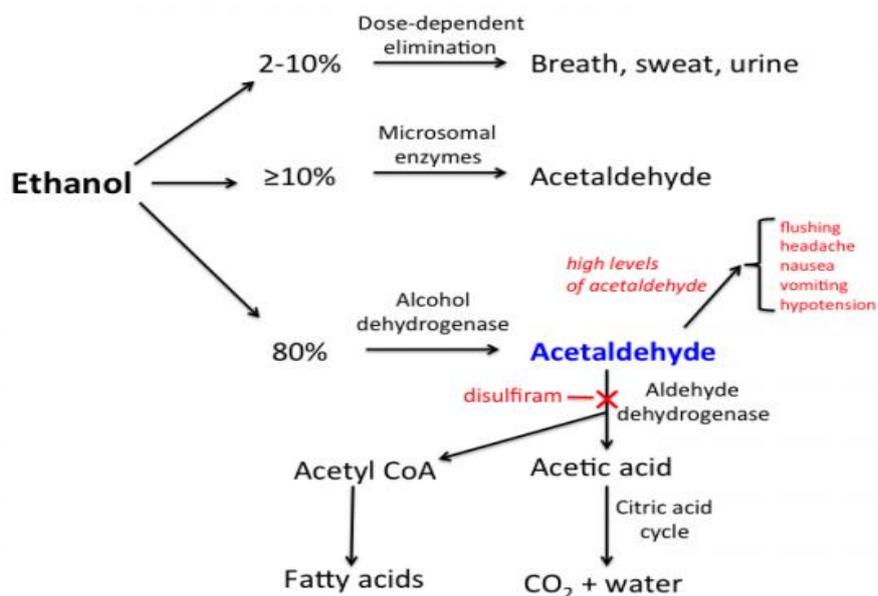
Methods and Methodology: The study was conducted in rural villages of Karnataka. Our study comprises 300 populations, out of which 250 were alcoholic and 50 were non-alcoholic. Among 250 alcoholic populations, 223 were males and 27 were females. The blood pressure of 250 alcoholic population were measured by sphygmomanometer and a special epidemiological questionnaire was completed by each participant. **Result:** The prevalence of hypertension was high in people drinking every day. For every day drinkers the blood pressure was independent of the amount they consume. Blood pressure was high in chronic drinkers. **Conclusion:** Our study concluded that there is a positive association between alcohol consumption and hypertension. The highest range of blood pressure among alcoholic population was found to be $>180/>110$ mmHg.

KEYWORDS: Alcohol, hypertension, blood pressure, alcoholic population, chronic drinkers.

INTRODUCTION

Alcohols are hydroxy derivatives of aliphatic hydrocarbons. It is classed as a depressant that slows down vital functions.

Mechanism of Action



Pharmacological Action

Alcohol has several effects on humans like:

- Local action- It acts as a mild rubefacient and counterirritant when rubbed on skin. It acts as an astringent and also as an antiseptic
- CNS- It acts as a neuronal depressant
- Blood- Regular intake of small to moderate amount of alcohol has been found to raise HDL cholesterol and decrease LDL oxidation. Heavy drinking can cause the number of oxygen-carrying red blood cells to be abnormally low. This condition, known as anaemia. Megaloblastic anaemia has been seen in chronic alcoholism due to interference with folate metabolism
- Body temperature- It is reputed to combat cold.
- Respiration- It acts as a respiratory depressant
- GIT- low concentration of alcohol is a gastric acid stimulant. Higher concentration inhibits gastric secretion causes vomiting, mucosal congestion and gastritis

- Liver- It leads to liver damage and many heavy drinkers develop cirrhosis, a sometimes-lethal condition in which the liver is so heavily scarred that it is unable to function. Chronic alcoholism subjects liver to oxidative stress and causes cellular necrosis followed by fibrosis
- Skeletal muscles- In chronic alcoholism weakness and myopathy occur.
- Kidney- It leads to diuresis
- Sex- Alcohol act as an aphrodisiac and chronic alcoholism leads to impotence, testicular atrophy and infertility in both men and women
- Endocrine effects- Moderate amounts of alcohol leads to hyperglycaemia and acute intoxication is often associated with hypoglycaemia. In addition drinking can inflame the pancreas. Chronic pancreatitis interferes with the digestive process, causing severe abdominal pain and persistent diarrhoea.
- CVS- The effect is dose dependent. Small dose- produce only cutaneous and gastric vasodilatation, skin is warm and flushed. Here BP is not affected. Moderate dose- cause tachycardia and mild rise in BP due to increased muscular activity and sympathetic stimulation. Heavy drinking and large dose, in particular can cause blood pressure to rise. Over time, this effect can become chronic. High blood pressure can lead to many other health problems, including kidney disease, heart disease, and stroke.

Lian was the first person to suggest a cause and effect relationship between regular alcohol consumption and blood pressure elevation (hypertension) in 1915. Hypertension (HTN or HT), also known as high blood pressure, is a long term medical condition in which the blood pressure in the arteries is persistently elevated.

According to JNC 8 and IGH 2013, classification for blood pressure

CATEGORY	SYSTOLIC(in mmHg)	DIASTOLIC(in mmHg)
Normal	<120	<80
Pre- HTN	120-139	80-89
Stage-1 HTN	140-159	90-99
Stage-2 HTN	>160	>100

Alcohol induced hypertension is one of the most common condition. And the relation between regular alcohol consumption and blood pressure has been described in several epidemiological surveys. Consumption of a single alcoholic drink may cause an acute rise in blood pressure [both systolic and diastolic BP] that resolves within 2 hours. In alcoholics, hypertension is common but settles after withdrawal from alcohol.

Symptoms of Alcohol Consumption at Different Levels of Blood Alcohol Concentration.

Blood Alcohol Concentration	Symptoms
<50mg/dl	Some impairment in motor coordination and thinking ability, talkativeness, relaxation
50-150mg/dl	Altered mood, friendliness, shyness or argumentativeness, impaired concentration and judgement, sexual disinhibition
150-250mg/dl	Slurred speech, unsteady walking, nausea, double vision, increased heart rate, drowsiness, mood, personality and behavioural changes which may be sudden, angry and antisocial
300mg/dl	Unresponsive or extremely drowsy, speech incoherent or confused, memory loss, vomiting, heavy breathing
>400mg/dl	Breathing slowed, swallow or stopped Coma, death

Moderate drinking is generally considered to be: Two drinks a day for men younger than age 65, one drink a day for men age 65 and older and one drink a day for women of any age. A drink is 12 ounces (355 millilitres) of beer, 5 ounces (148 millilitres) of wine or 1.5 ounces (44 millilitres) of 80-proof distilled spirits. One unit of alcohol is equal to ½ pint= 10 ml.

Potential Conditions and Complications of Chronic or Heavy Episodic Alcohol Use, By Body Part Affected.

Body Part Affected	Symptoms
Mouth	Cancer of mouth, voice box and throat
Stomach and food pipe	Cancer of food pipe (oesophagus) Chronic gastritis
Intestines	Cancer of bowel
Liver	Cancer of liver Alcoholic liver disease (fatty liver, hepatitis, cirrhosis)
Pancreas and sugar digestion	Acute and chronic pancreatitis
Heart and blood pressure	Coronary heart disease Hypertension Heart failure due to cardiomyopathy Irregular heartbeat
Blood and immune system	Anaemia HIV/AIDS Hepatitis C Tuberculosis Infections
Lungs	Pneumonia
Brain and nervous system	Brain damage (Wernicke's encephalopathy, Korsakoff's dementia, etc) Nerve damage Epilepsy Sleep disturbances Stroke
Mental health	Addiction/dependence Mood disorders Withdrawal symptoms
Sexual health	Impotence Infertility Fetal alcohol spectrum disorder (in children born to women who drink while pregnant) Premature birth/low birth weight (in babies born to women who drink while pregnant)
Breasts (women)	Cancer of breast
Bones and muscles	Muscle weakness Gout
Eyes	Decreased vision

Objective of the Study**➤ Primary Objective**

1. To determine the effect of alcohol on blood pressure.

➤ Secondary Objective

1. To create awareness among people about complications of regular alcohol consumption
2. To determine the highest range of blood pressure in alcoholic population.

➤ Review of Literature

1. **Maheswaran et al. 1991**; Studied on hypothesis of action of alcohol on blood pressure is rapidly reversible and that its effect is therefore mainly due to very recent alcohol consumption. This was an occupational screening survey. They conducted the study in 577 subjects out of which 272 were men and 305 were women. It was a 1 week study and the subjects were asked to take 1g to 40g of alcohol per day. The study was categorized as recent and previous alcohol intake. Recent intake was defined as amount of alcohol consumed on day 1, 2 and 3 immediately preceding blood pressure measurement and previous intake was defined as amount consumed on days 4, 5 and 6 preceding blood pressure. And in this study, they have concluded that high recent alcohol intake significantly raised systolic and diastolic blood pressure in both men and women. Previous alcohol intake, however, did not appear to influence blood pressure.
2. **Myoung Kyun Son et al. 2011**; Studied on association between alcohol consumption and hypertension. In this cross-sectional study, they aimed to identify the association between alcohol consumption and hypertension, and verify whether this association is influenced by age. The study included 498 men and 610 women, aged 23 to 88 years, who underwent periodic health examinations. The subjects were given 1 to > 19 drinks per week. And the result was there is a positive association between the prevalence of hypertension and alcohol consumption of >19 per week in subjects of age greater than or equal to 60 years and not in subjects of age less than 60 years. So, they concluded that heavy alcohol consumption increases the risk of hypertension, but the effect of light to moderate alcohol consumption on the risk of hypertension remains controversial.
3. **Michael H. Criqui et al. 1981**; Studied on alcohol consumption and blood pressure relationship. The relationship between alcohol consumption and systolic and diastolic blood pressure (BP) was examined in 2482 men and 2301 women 20 years of age or older

in nine North American populations. And the study concluded that men at the highest level of alcohol consumption (30ml alcohol per day) had the highest BP, while women either at the highest level of alcohol consumption or consuming no alcohol had the highest BP. Men aged ≥ 35 years of age consuming 30ml alcohol per day were 1.5 to 2 times more likely to be hypertensive than non-drinkers. Multivariate analysis showed systolic and diastolic BP in both men and women to be positively and significantly ($p < 0.05$) related to alcohol consumption, and this relationship was independent of the potential confounding effects of age, obesity, cigarette smoking, regular exercise, education, and gonadal hormone use in women. And the regression coefficients indicated that an average of 30ml of alcohol per day would produce a 2 to 6 mm Hg increase in systolic BP.

4. **E.A. Skliros et al. 2012;** Studied on relationship between alcohol consumption and hypertension among elderly Greeks. The study included 615 elderly individuals of average age 73.5 ± 6.15 years. The study was performed through questionnaire and by checking blood pressure. Odds ratio were also calculated and adjusted for potential confounders. The subjects were given 10g to more than 300g of alcohol per week. And the result of the study shows the overall prevalence of hypertension was 69.1%, 70.7% in men and 67% in women. Those subjects taking alcohol of greater than 300g (heavy drinker's) was related to hypertension control. So, this study concluded that level of control among the elderly is positively associated with alcohol intake only for heavy drinkers.
5. **Shingo Seki et al. 2015;** Studied on impact of alcohol intake on blood pressure. The study included 171 subjects. The subjects were divided into 2 groups, the first group included regular alcohol drinkers (more than 2.5g of alcohol/day, $n=74$, 82.4% men) and the second group included non-drinkers ($n=97$, 33% men). And the result of the study was there was an increase in diastolic pressure in alcoholic drinkers as compared to non-drinkers (01.6 ± 11.5 mmHg vs. 96.8 ± 8.2 mmHg, $p < 0.01$). So the study concluded that there is a positive association between alcohol and increased blood pressure.
6. **M.A. Ireland et al. 1984;** Studied on acute effect of alcohol consumption on blood pressure. The study was conducted in 14 male university students with light to moderate drinking habits. The study subjects were estimated from the questionnaire to drink 170 ± 55 ml alcohol per week. The subjects were asked to take drinking water and non-

alcoholic beer with added alcohol at different time. And the result was there was a significant increase in the systolic blood pressure time after consumption of drink of added alcohol. This rise was apparent after the first drink and before there was a major increase in the blood alcohol concentration at 10 – 20min compared with basal value at 0 min and the systolic pressure rapidly declined after the second drink. There was no change in systolic when water was drunk. The diastolic pressure increased after both the drinks. So, they concluded that there is acute effect of alcohol consumption on blood pressure.

7. **Yang HK et al. 2015;** Studied on different effect of alcohol consumption on hypertension according to metabolic health status. The study was conducted in 6329 male subjects. The subjects were grouped as heavy drinkers (≥ 30 g per day), binge drinkers (≥ 7 glasses per day). The study concluded that among 6329 subjects 37.04% had hypertension. In the younger age groups subjects with problematic alcohol drinking have shown a higher prevalence of hypertension in both non-obese and obese individuals compared with subjects who were non-obese and not were problematic alcohol drinkers. From this study, they concluded that problematic alcohol drinking increased the risk of having hypertension approximately 3 times in young non-obese individuals who have demonstrated a metabolically obese phenotype as compared with those who were metabolically healthy.

8. **I. B. Puddey et al. 1985;** Studied on the effects of varying alcohol intake on blood pressure in moderate normotensive drinkers in a randomized, controlled, crossover trial. The study included forty-eight regular moderate drinkers of age group of 25-55 years. The study subjects were given 210 ml ethanol/week. All subjects entered a 2-week familiarization period during which they were stratified and matched as closely as possible for age, obesity index, blood pressure and alcohol consumption. They were then randomly allocated to one of two groups; group 1 ceased normal drinking habits for the ensuing 6 weeks and drank low alcohol content beer only. They were provided with six 750 ml bottled week of this beer and instructed to drink as little or as much as they wished but no other alcoholic beverage. Normal drinking habits were resumed for a second 6-week period during which six 750 ml bottled week of normal alcohol content beer were provided. Group 2 participated in a reverse design, initially continuing normal drinking habits and then drinking low alcohol content beer only. Throughout the study

systolic and diastolic blood pressure and heart rate were measured at weekly intervals with an automatic oscillometric recorder. Readings were taken after 6 min supine and 2 min standing. At each visit subjects completed a retrospective diary of the preceding week's alcohol consumption. And concluded that chronic heavy consumption of alcohol increases the risk of hypertension.

9. **Mori et al. 2015;** Studied on randomized control intervention of the effect of alcohol on blood pressure in premenopausal women. The study included twenty-four subjects of age group 25 to 49 years with a mean alcohol intake of 20.2% to 29.4% per week. The study subjects were given higher volume red wine (lower level drinkers 14.6% of alcohol/week and higher level drinkers 21.8% alcohol/week), lower volume red wine (lower level drinkers 4.2% of alcohol/week and higher level drinkers 7.3% of alcohol/week). And the study result was there were similar changes for high volume red wine and low volume red wine. So, the study concluded that in healthy premenopausal women regular consumption of alcohol as 20%- 30% of red wine/day elevates systolic and diastolic blood pressure.
10. **Pandey et al. 2013;** Studied on relationship between smoking, alcohol and hypertension. The present study was undertaken to study the prevalence of hypertension and its associated factors like age, gender, smoking and alcohol among rural population of South India. The current research was a questionnaire based study carried out in two phases with Blood Pressure measurement. They conducted the study in 650 rural population. The study result was there is an increase prevalence of hypertension in females with advancing age and with exposure to risk factors like alcohol and smoking. With alcoholics, it was observed that the incidence of hypertension and pre-hypertension increases with increase in alcohol consumption. So the study concluded that there is a direct relationship between the risk factors like alcohol or smoking and hypertension.
11. **Nunez Cordoba JM et al. 2009:** They did a prospective study on association between alcohol consumption, including alcoholic beverage preference and weekly pattern of consumption and risk of hypertension in a Mediterranean cohort. The study was conducted prospectively in 9963 Spanish men and women initially without hypertension. They have collected self-reported and validated data on diet and hypertension diagnosis. And they found that hazard ratio for hypertension among those who consumed alcohol on ≥ 5 days/week was 1.28 compared to abstainers and for among those who drank alcohol ≥ 5 days/week the hazard ratio for hypertension associated with consuming ≥ 1 drinks/day

was 1.45 compared to abstainers and hazard ratio for hypertension associated with consuming > 0.5 drinks of beer/day was 1.53. And they concluded that the Mediterranean population, consuming beer or spirits, but not wine, was associated with a higher risk of developing hypertension and the weekly pattern of alcohol consumption did not have a significant impact on the risk of hypertension.

12. Pajak et al. 2013: They did cross sectional study on association between binge drinking and blood pressure to investigate whether binge drinking pattern influence blood pressure independently from drinking volume or whether it modifies the effect of volume of drinking. The study was conducted in a 7559 men and 7471 women aged 45-69 years in 2002-2005, who was not on anti-hypertensive medication, from Russia, Poland and Czech Republic. The study was based on annual alcohol intake, drinking frequency and binge drinking (≥ 100 g in men and ≥ 60 g in women in one session at least once a month), which was estimated from graduated frequency questionnaire and by analyzing blood pressure. The result was in both men and women, the high blood pressure was due to binge drinking.

13. Lang T et al. 1987: They did cross sectional study on relationship between alcohol consumption and hypertension prevalence in a French population. The study was conducted in 6632 subjects employed in 420 small and medium sized companies in Paris region. They conducted the study through interview and blood pressure measurement. And the study has concluded that there is a positive association between alcohol consumption and prevalence of arterial hypertension.

14. Prasada Rao N et al. 2016: They did a cross sectional study on effects of alcohol consumption and tobacco on various health parameters among rural areas of Coimbatore, India. The study included 485 patients who were explained about the study and its benefits, a detailed history of age, dietary pattern, cooking oil type, history of drinking and tobacco, past illness and drug history were taken. Subjects vitals were measured and blood was taken to estimate serum ALT, AST and ALP and data obtained and were analyzed using SPSS 16. And the study concluded that there is an increased systolic and diastolic blood pressure and ALT level in alcoholic and tobacco users.

15. Ueshima et al. 1993: They studied on effect of alcohol consumption on blood pressure in untreated hypertensive Men. The study was a randomized, controlled crossover trial

which was conducted in fifty-four untreated, mildly hypertensive men whose daily alcohol consumption was ≥ 28 ml ethanol and who drank at least 4 times per week. The main purpose of this trial was to test the effects of alcohol reduction on blood pressure. In this study, after a 2-week familiarization period, the participants were assigned to either a reduced alcohol drinking group or a usual drinking group for 3 weeks. The situation was then reversed for the next 3 weeks. The participants were requested to limit their daily alcohol consumption to zero or reduce it as much as possible for the reduced alcohol consumption period. The result of the study was there was a lowering effect on blood pressure after the alcohol consumption was reduced which were estimated by 24-hour urine collection and body weight and this change in BP was independent of changes in salt consumption. So the study concluded that a reduction in daily alcohol drinking was effective in lowering blood pressure for nonrelated mildly hypertensive patients who regularly consume alcohol.

METHODOLOGY

- **Duration of study**

The study was conducted for a period of 6 month.

- **Site of the study**

Study was conducted in rural area.

- **Study design**

A questionnaire based cross sectional study.

- **Sources of data and materials**

- Patient questionnaire
- Sphygmomanometer
- Stethoscope

- **Study Criteria**

- **Inclusion Criteria**

- People of all gender
- People who are alcoholic and non-alcoholic
- Patients with cardiovascular diseases and other alcohol induced diseases

- **Exclusion Criteria**

- Candidates with incomplete and ambiguous answers were excluded from the study

• Method of Data Collection

This study was conducted in rural villages of Karnataka. Questionnaires were employed for each individual who will give their consent to participate in the study. We performed blood Pressure measurement, counseled the patients about the disease and assess the risk factors associated with blood pressure changes or deviation from the normal.

Study procedure

It is a questionnaire based cross sectional study in which the people satisfying the inclusion criteria will be provided with a multiple questioned- questionnaire, measured blood pressure by Sphygmomanometer and collected the questionnaire back after filling. The incomplete and ambiguous answers were excluded from the study.

RESULT

Table 1: Sample Size.

SNO	Category	No of Subjects	Percentage
1	Alcoholic	250	83%
2	Non- Alcoholic	50	17%
TOTAL		300	100%

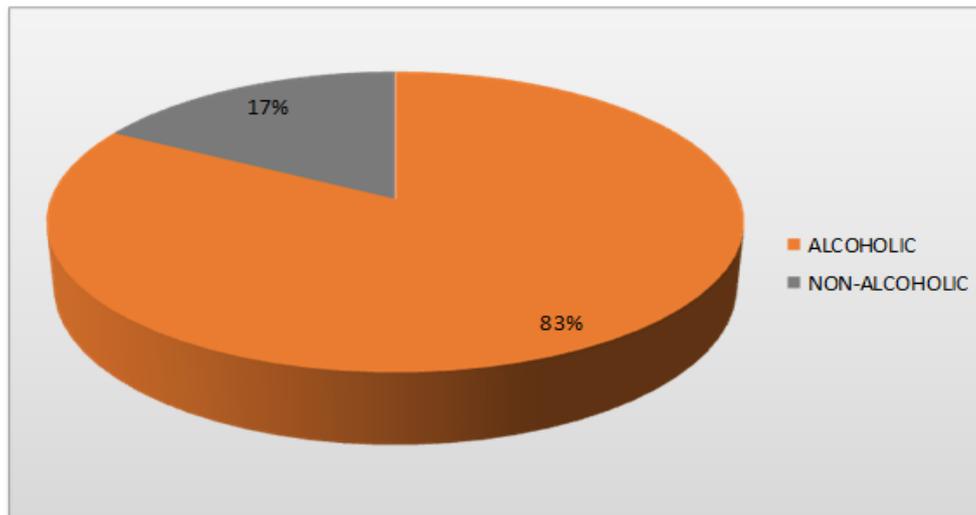


Fig. 1: Sample Size.

In a sample size of 300, 83% (n=250) were alcoholic and 17% (n=50) were not alcoholic.

Table 2: Gender-Wise Distribution of Subjects.

Sl No	Gender	No of Subjects	Percentage
1	Male	223	89%
2	Female	27	11%
TOTAL		250	100%

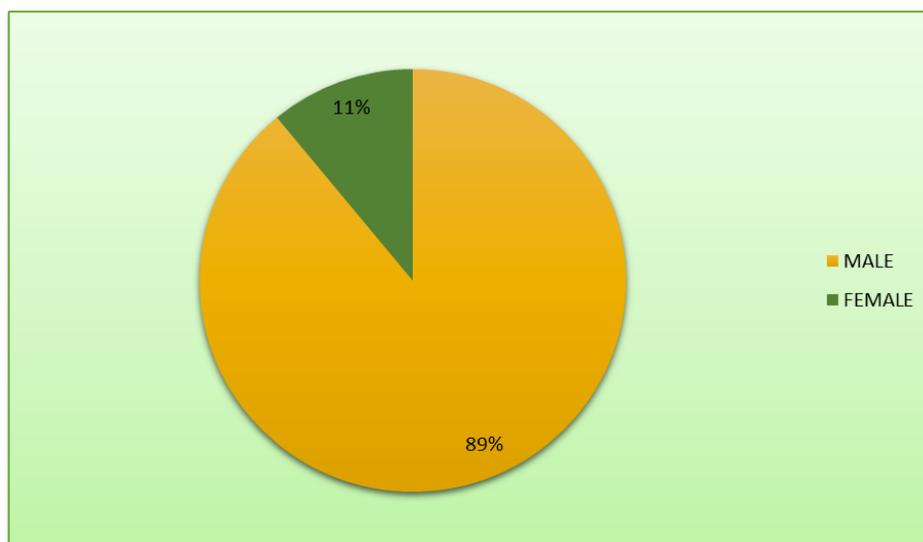


Fig. 2: Gender-Wise distribution of subjects.

The gender wise distribution considering male and female was found that 78% (n=227) was male and 22% (n=23) was female.

Table 3: Age-Wise Distribution.

Sl No	Age Group	No of Subjects	Percentage
1	21-30	15	6%
2	31-40	28	11%
3	41-50	70	28%
4	51-60	48	19%
5	61-70	62	25%
6	71-80	22	9%
7	81-90	5	2%
TOTAL		250	100%

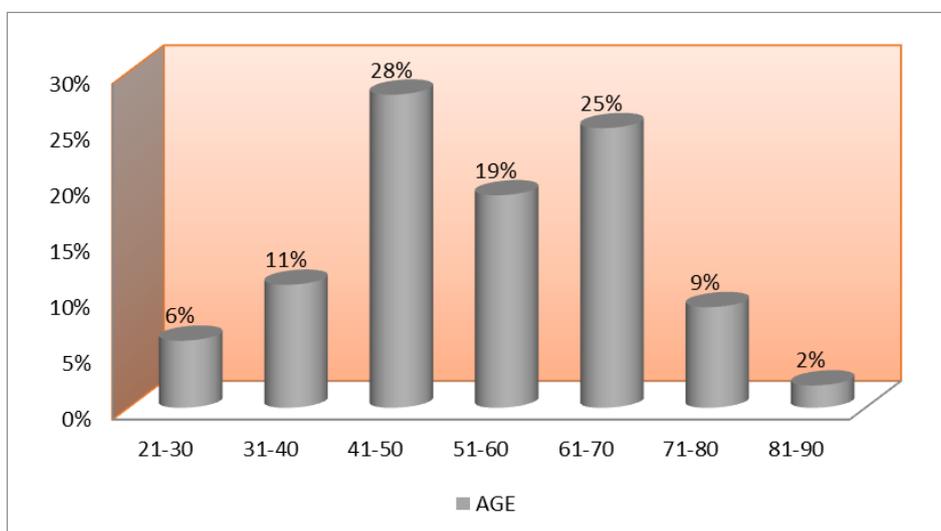


Fig. 3: Age wise distribution.

The major group consuming alcohol was between the age group 41-50 (28%) followed by age group 61-70 (25%) and subjects with age group 81-90 (2%) were the least.

Table 4: Blood Pressure Range.

SL NO	BP (in mmHg)	No of Subjects	Percentage
1	Normal BP	6	2%
2	Pre-HTN	27	11%
3	Stage-1 HTN	141	56%
4	Stage-2 HTN	76	31%
TOTAL		250	100%

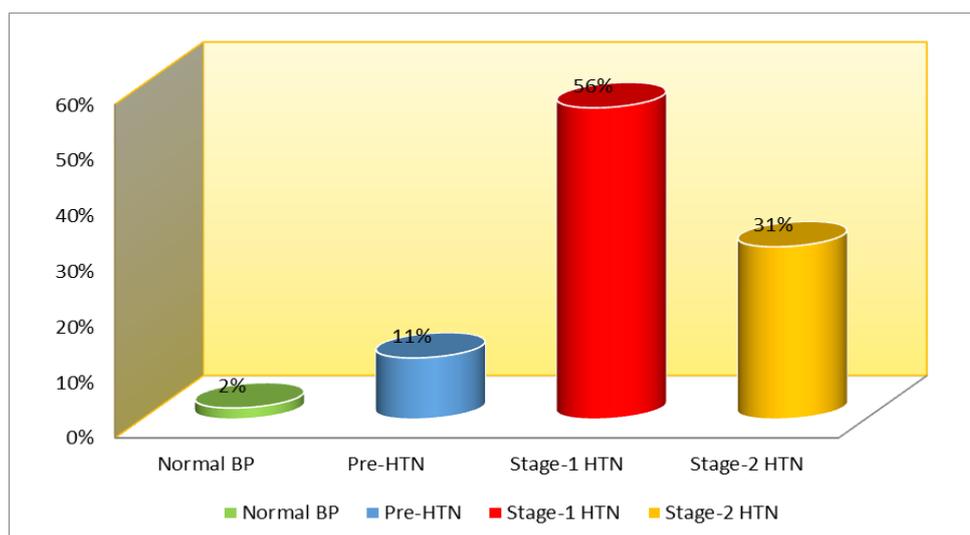


Fig. 4: Blood pressure range.

Among the alcoholic population Stage-1 HTN was observed in 56% subjects (n=141), Stage-2 HTN was found in 31% subjects (n=76) and 2% subjects (n=6) blood pressure was normal.

Table 5: Alcohol Consumption on An Average.

SL NO	Alcohol Consumption	No of Subject	Percentage
1	2-3 times a month	17	7%
2	2-3 times a week	35	14%
3	4 or more times a week	58	23%
4	Everyday	140	56%
TOTAL		250	100%

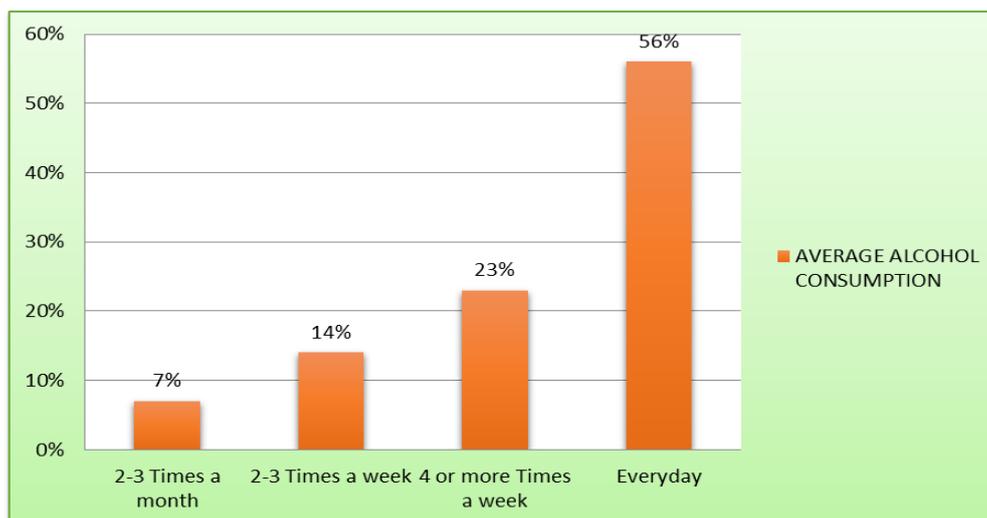


Fig. 5: Alcohol consumption on an average.

Of the alcoholic population 56% (n= 139) subjects were daily drinkers, 23% (n=58) were people who takes alcohol 4 or more times a week, 14% (36) were people who consumes 2-3 times a week and 7% (n=17) were people who drinks 2-3 times a month.

Table 6: Alcohol Consumption Per Day.

Sl No	Alcohol Consumption on an Average	Alcohol Consumption Per Day (in ml)	No of Subjects	Percentage
1	2-3 times a month	10-20	5	2%
		30-40	5	2%
		50-60	6	2%
		>60	1	0%
2	2-3 times a week	10-20	10	5%
		30-40	9	4%
		50-60	12	5%
		>60	4	2%
3	4 or more times a week	10-20	15	6%
		30-40	6	2%
		50-60	10	4%
		>60	27	11%
4	Everyday	10-20	7	3%
		30-40	13	5%
		50-60	38	15%
		>60	82	32%
TOTAL			250	100%

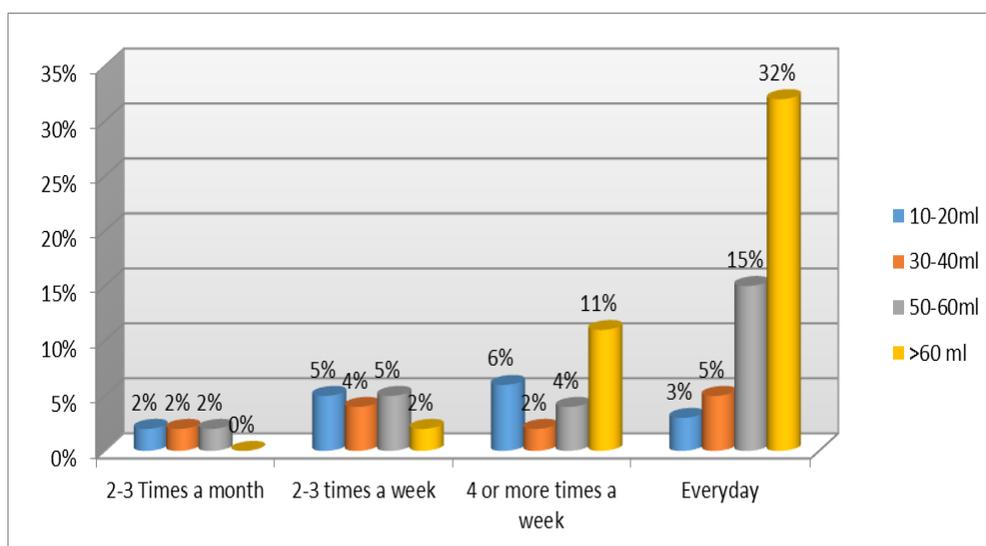


Fig. 6: Alcohol consumption per day.

Among alcoholic population, the highest number of subjects consuming alcohol was >60ml Everyday.

Table 7: Alcohol Consumption and Blood Pressure Range.

Sl No	Alcohol Consumption on An Average	Blood Pressure Range (Mmhg)	No of Subjects	Percentage
1	2-3 times a month	Normal BP	3	1.2%
		Pre-HTN	10	4.0%
		Stage-1 HTN	3	1.2%
		Stage-2 HTN	2	0.8%
2	2-3 times a week	Normal BP	1	0.4%
		Pre-HTN	8	3.2%
		Stage-1 HTN	17	6.8%
		Stage-2 HTN	9	3.6%
3	4 or more times a week	Normal BP	1	0.4%
		Pre-HTN	6	2.4%
		Stage-1 HTN	36	14.4%
		Stage-2 HTN	14	5.6%
4	Every day	Normal BP	1	0.4%
		Pre-HTN	3	1.2%
		Stage-1 HTN	85	34.0%
		Stage-2 HTN	51	20.4%
TOTAL			250	100%

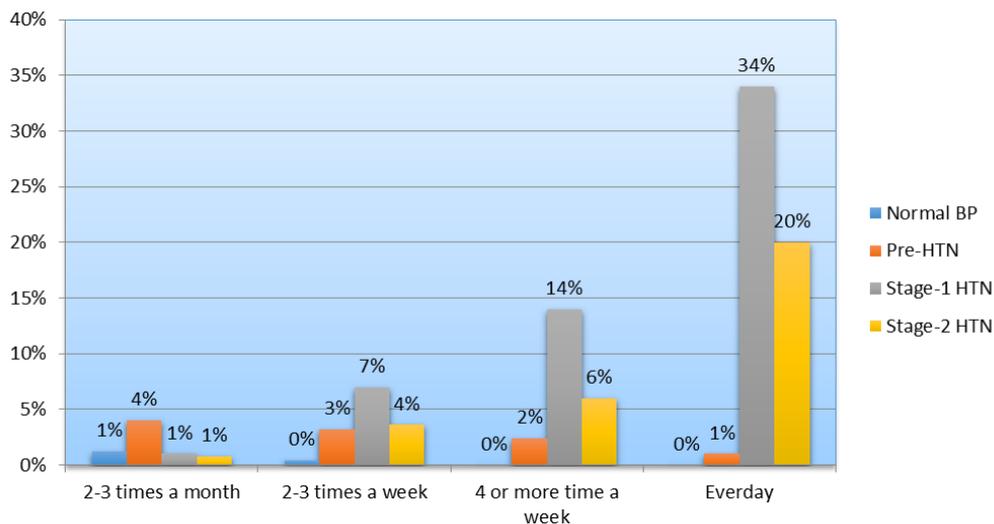


Fig. 7: Alcohol consumption and blood pressure ranges.

Among the alcoholic population, number of subjects consuming alcohol everyday was the highest 34% (n=85) having blood pressure ranges between 140-159/90-99mmHg (Stage-1HTN).

Table 8: Alcohol Consumption Everyday and Prevalence of Hypertension.

SL NO	Blood Pressure Stages	Amount of Alcohol Consumption Every Day (In ml)			
		10-20 ml	30-40 ml	50-60 ml	>60ml
1	Normal BP	1	0	0	0
2	Pre- HTN	0	1	2	0
3	Stage-1 HTN	0	0	3	82
4	Stage-2 HTN	0	13	38	0
TOTAL	140				

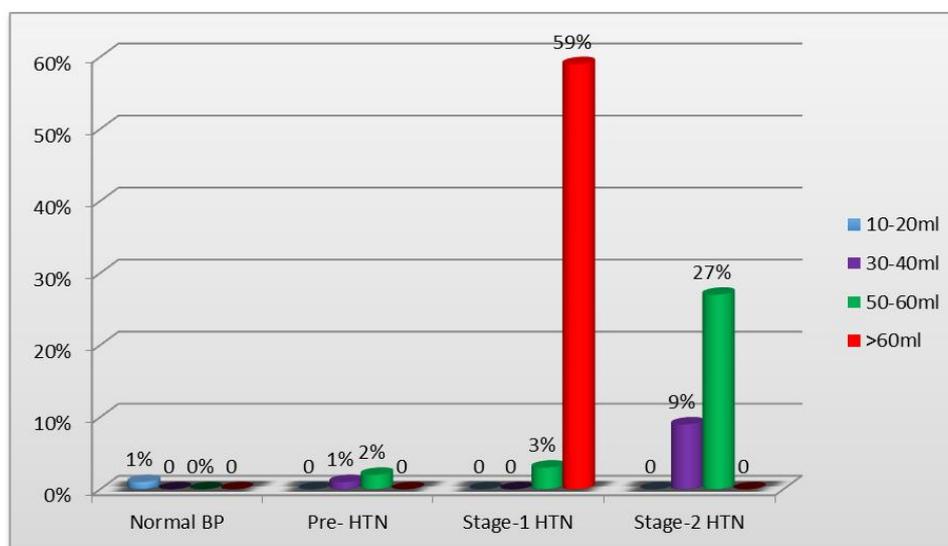


Fig. 8: Alcohol consumption every day and prevalence of hypertension.

Among the alcoholic population, number of subjects consuming >60ml of alcohol everyday was the highest in which higher number of subjects were having blood pressure range between 140-159/90-99mmHg (Stage-1 HTN).

Table 9: Category on Medication.

SL NO	Category	No of Subjects	Percentage
1	Hypertensives taking medication	82	33%
2	Hypertensives not taking medication	136	54%
3	Normotensives	32	13%
TOTAL		250	100%

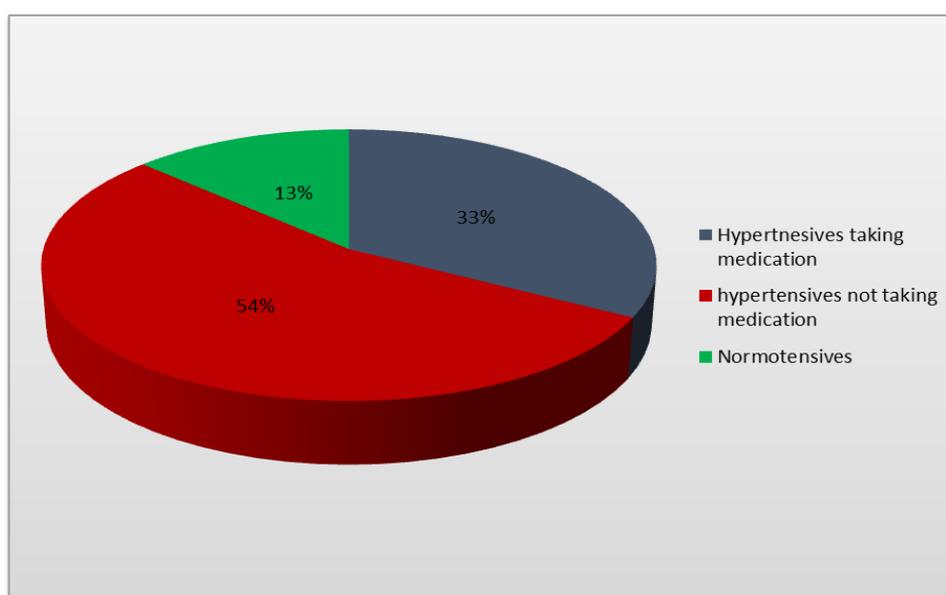


Fig. 9: Category on Medication.

Among alcoholic population the highest was hypertensives not taking medication (54%), followed by hypertensive subjects taking medication (33%) and the least was normotensive subjects (13%).

Table 10: Co Morbidities.

SL NO	Co-Morbidities	No of Subjects	Percentage
1	Diabetes Mellitus	46	32%
2	High Cholesterol	31	21%
3	Poor Vision	18	12%
4	Intermittent Claudication	38	26%
5	Kidney Disease	3	2%
6	Any other disease	11	7%
TOTAL		147	100%

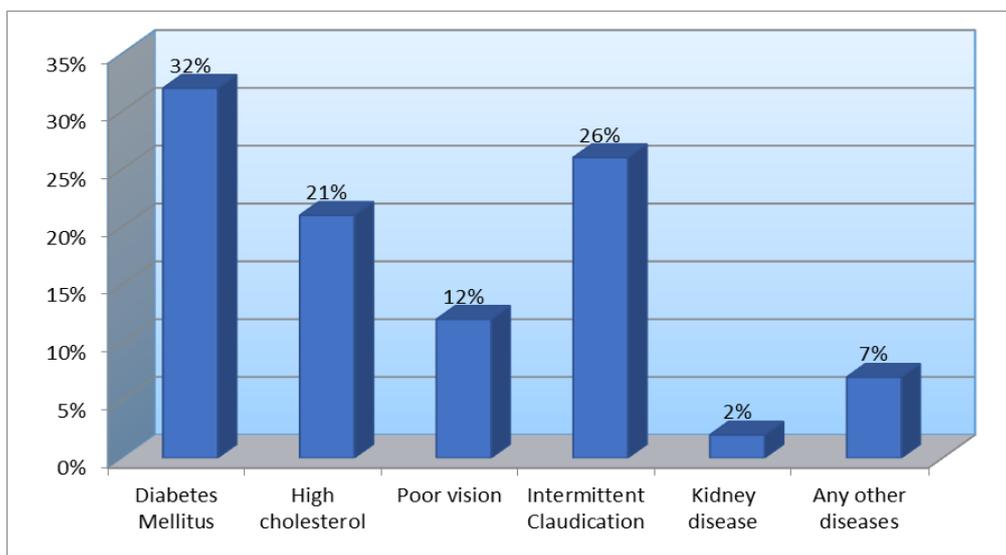


Fig 10: Co-Morbidities.

The highest percentage of Co-Morbidity in subjects consuming alcohol was diabetes mellitus (32%), second highest was intermittent claudication (26%), followed by high cholesterol (21%), poor vision (12%), any other disease (7%) and kidney disease (2%).

Table 11: Other Habits.

SL NO	Other Habits	No of Subject	Percentage
1	Chewing tobacco	76	30%
2	Smoking tobacco	102	41%
3	Both (chewing and smoking tobacco)	14	6%
4	Not taking both	58	23%
TOTAL		250	100%

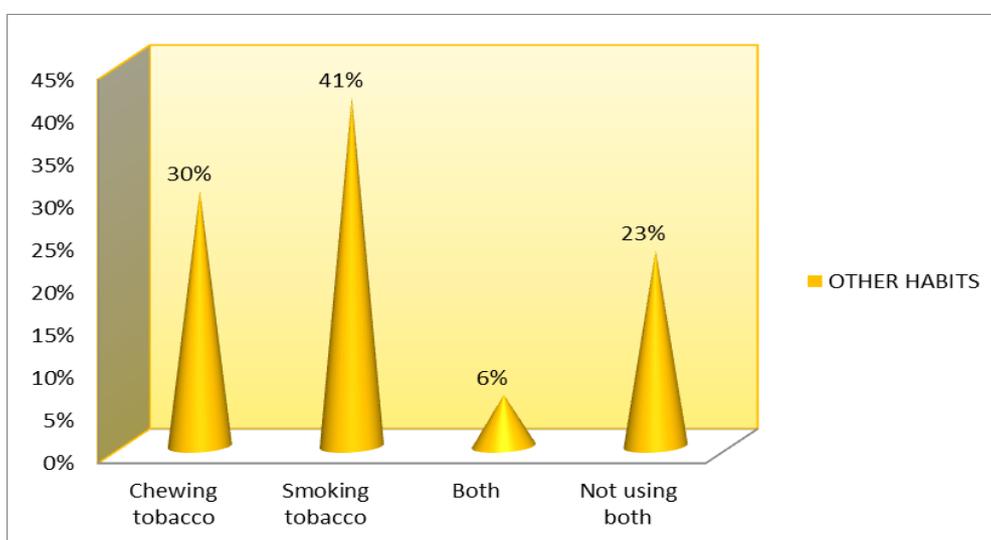


Fig 11: Other habits.

Among the alcoholic population the highest number of subjects was found to be smoking tobacco (41%), the second highest was chewing tobacco (30%) and only 6% of subjects were having both habits.

DISCUSSION

This study provided information about the effect of alcohol on blood pressure in rural villages of Karnataka, from a total of 300 rural populations studied 250 were found alcoholic and 50 non-alcoholic.

In other study conducted by Michael H. Criqui et al.1981 on alcohol consumption and blood pressure relationship in North America also cross-sectional in nature, included male and female population which was almost equal in number but our data found that men consuming alcohol were more (n=223) and female were less (n=27).

In our study we found subjects of age group 21-90, among that the major group consuming alcohol was between the age 41-50 (28%) followed by age 61-70 (25%).

When the BP distribution among the study population was evaluated it was observed that a considerable number of individuals were either hypertensives or in risk of development of hypertension. 11% population were Pre-hypertensive, 56% subjects were suffering from Stage-1 HTN and 31% from Stage-2 HTN.

Of the alcoholic population considering alcohol consumption on an average it was found that 56% (n= 139) subjects were daily drinkers, 23% (n=58) were people who takes alcohol 4 or more times a week, 14% (36) were people who consumes 2-3 times a week and 7% (n=17) were people who drinks 2-3 times a month.

In our study we found that among alcoholic population the highest number of subjects consuming alcohol was >60ml everyday.

The study conducted by I. B. Puddey et al. 1985 concluded that chronic heavy consumption of alcohol increases the risk of hypertension. Similarly our study among the alcoholic population, showed that number of subjects consuming alcohol everyday was highest 34% (n=85) having blood pressure ranges between 140-159/90-99mmHg. Numerous studies revealed that light, occasional drinkers had lower blood pressures compared with abstainers, while light, daily drinkers had higher blood pressures. Although the quantity of alcohol

required to produce this pattern differed somewhat among studies, one or two drinks per day were generally sufficient to elevate blood pressure.

The study conducted by Myoung Kyun Son *et al.* 2011 on association between alcohol consumption and hypertension which is also cross-sectional in nature concluded that heavy alcohol consumption increases the risk of hypertension. Similarly in our study, alcohol consumption and prevalence of HTN showed number of subjects consuming alcohol >60ml per day was the highest in which these subjects blood pressure range was between 140-159/90-99mmHg.

Table 9 shows that hypertensive taking antihypertensive medication was 33% (n=82), hypertensive not taking medication was 54% (n=136) and normotensives were 13% (n=32). During our study we found that subjects were hypertensive.

The highest percentage of Co-Morbidity in subjects consuming alcohol was diabetes mellitus (32%), second highest was intermittent claudication (26%), followed by high cholesterol (21%), poor vision (12%), any other disease (7%) which includes Angina, liver diseases, Myocardial infarction, Congestive heart disease and kidney disease (2%).

Among alcoholics who were also smoking tobacco and chewing tobacco, the results depicted a progressive increase in the percentage of individuals smoking tobacco (41%) and chewing tobacco (30%) and taking both. In other words the results showed that the chances of hypertension increases with the increase in habits like smoking tobacco and chewing tobacco.

CONCLUSION

The study concluded that light to moderate alcohol consumption can be associated with a decreased risk of hypertension, whereas heavy alcohol intake can increase the risk of hypertension.

To conclude, in most of the population studied, blood pressure levels were greater for subjects consuming alcohol every day and levels of alcohol consumption (>60 ml per day) than at minimal levels (10-20 ml per day). The highest range of blood pressure was found to be >180/>110mmHg for individual consuming alcohol.

The present study also revealed that co morbidity along with hypertension was Diabetes Mellitus, High cholesterol, intermittent claudication, kidney diseases, poor vision etc. Along

with alcohol it has been seen that smoking tobacco and chewing tobacco can also increase the risk of hypertension.

SUMMARY

The present study is a questionnaire based cross sectional study conducted over a period of 6 months in rural villages of Karnataka.

A total of 300 subjects were included in the study, in which 250 were alcoholic population and 50 were non-alcoholic.

Among 250 alcoholic population, 223 males and 27 females were enrolled in the study for the assessment of effect of alcohol on BP.

From our study we found that the number of subjects consuming alcohol was more in the age group between 41- 50 years 28% (n=70).

The blood pressure of people consuming alcohol every day was found to be highest 56% (n=140).

The number of subjects consuming >60 ml everyday was highest 113, in which majority of population's blood pressure was found in stage 1 and stage 2 hypertension.

Majority of population were hypertensive in which 33% (n=82) were known case of hypertensive and who were taking medication, 13% (n=32) were normotensive and the rest 54% (n=136) were found as hypertensive in the study who were not taking medication.

Most of the alcoholic population who were included in the study were associated with other diseases called as co-morbidity. The highest percentage of co-morbidity in subjects was reported to be diabetes mellitus (32%), followed by intermittent claudication (26%), high cholesterol (21%), poor vision (12%), any other disease (7%) and kidney disease (2%).

A major percentage of subjects were found who were smoking tobacco 41% (n=102), 30% (n=76) were found chewing tobacco and 6% (n=14) found using both.

Future Direction

1. The study can be expanded to a longer period for better analysis and result.
2. Other disease can be considered/ included in the inclusion criteria in the future studies.

3. The study can also be conducted by taking blood pressure before and after drinking for better results
4. The study can be expanded in alcoholic population taking anti- hypertensive medication for better understanding of effect of alcohol in hypertensive patient taking medication

Limitations

1. The study was conducted in short period of time.
2. The sample size of the study was limited.
3. The study could not give the exact data as the subjects were not cooperative with the questionnaire.

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