
A cross sectional study on effects of tobacco and alcohol consumption on various health parameters among rural areas of Coimbatore, India

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Abstract

Background: Tobacco consumption as pan, bidi and cigarettes is an omnipresent problem. A recent increase in alcohol use is being observed in India. These may invariably lead to various health problems.

Aim: To assess the association between tobacco and alcohol consumption on various diseases and risk factors for diseases caused by them.

Methodology: 485 patients attending Karpagam Faculty of medical sciences and research hospital OPD for various illnesses were taken for study. After explaining about the study and its benefits, a detailed history of age, dietary patterns, cooking oil type, History of tobacco and drinking, past illnesses, drug history were taken. Their vitals were measured and Blood was taken in the laboratory to estimate serum Alanine aminotransferase, Aspartate aminotransferase and Alkaline phosphatase. The data obtained were analyzed using SPSS 16. One way Anova was done to differences between disease and risk factors presence tobacco users and non tobacco users; differences between disease and risk factors presence between alcohol consumers and non alcohol consumers.

Conclusion: Our study indicates that tobacco users have significantly increased Systolic and diastolic blood pressure and ALT irrespective of type of tobacco used. Also alcohol consumption is related with increased systolic and diastolic blood pressures as well as ALT.

Keywords: Tobacco, smokeless tobacco, smoking, alcohol, blood pressure, liver enzymes

1. Introduction

About 34.6% of adult population in India uses tobacco as cigarettes, bidis and smokeless tobacco including Betel quid, chewable tobacco and Guthka. Among them, the rural population are worst affected where a staggering 38.4% were tobacco users compared to that of urban region which stands at 32.5% [1]. Even as 1902, oral cancer was attributed to smokeless tobacco in India [2]. Bidi smoking causes damages similar to cigarette smoking [3]. An estimated one million people die in India due to tobacco use. It is calculated that if the current smoking patterns is reduced to half by the year 2020, around 180 million deaths due to tobacco can be prevented.

The harmfulness of tobacco is well documented. Tobacco causes cancers of the lung, oral cavity, Pharynx, nasal cavity, paranasal sinuses, larynx, esophagus, stomach, pancreas, liver, kidney, ureter, urinary bladder, uterine cervix and bone marrow [5]. Bidi smoking, the commonest form of smoking in India, can cause cancers of oral cavity, pharynx, larynx, esophagus, lung and stomach [5]. A study revealed that 40.43 % cancers in males in India and 59% of all cancers among females are attributed to tobacco use [7].

Even if assessing systolic BP immediately after environmental smoking exposure may be difficult unless in experimental findings, one cannot deny its increase and, consequently, its interpretation as a marker of smoking exposure [12]. The acute effects of smokeless tobacco have been documented by increases of up to 21 mm Hg in systolic blood pressure and 14 mm Hg in diastolic blood pressure and by an average increase of 19 beats per minute in heart rate[10].

Cigarette smoking has been associated with acute insulin resistance. Although the mechanism is not entirely clear, it may be related to increased levels of nor epinephrine or other counter regulatory hormones, such as growth hormone or Cortisol. Eliasson *et al*[11] demonstrated that smokeless tobacco users had higher insulin levels than nonusers, suggesting a similar link between smokeless tobacco and insulin resistance.

Around 2006, the numbers of users of alcohol in India were estimated at 62.5 million. Among them 17% were dependent on alcohol [8]. It is also estimated that among, Hospital admissions in India, 20-30 percent was due to

alcohol related issues [9]. Alcohol can lead to Diabetes in two ways. Alcohol can lead to insulin resistance [12,13] and also by causing a toxic effect on the pancreas [14] or indirectly by increasing adiposity [15,16]. Alcohol abuse is a frequent contributor to elevated blood pressure and may be the most common cause of secondary hypertension.[17].

Based on the above observations, we planned a study on impact of tobacco use and alcohol among various health indices in rural regions of Coimbatore, Tamilnadu.

2. Methods

This is a cross sectional observational study conducted between March-April 2015 in Karpagam faculty of medical sciences and research Hospital, Coimbatore, India. Institutional Human Ethical Committee clearance was obtained prior to the study. A total of 485 patients attending OPD for various illnesses were enrolled in the study. Informed consent form was obtained from all participants. The participants were interviewed in detail and their general characteristics like age and sex obtained. Other parameters like Present illness, past illness, their duration, type of cooking oil used, nature of diet like vegetarian or mixed diet; History of smoking, its type; smokeless tobacco use; alcohol; these answers were recorded in detail along with age of starting the habit, quantity, type, cessation, etc., Those who have abstained from tobacco/alcohol use for a period of five years were classified as non users. Those who are consuming regularly were taken as users. Vitals and anthropometry were

recorded. Detailed physical examination was done on all participants by a Medical officer and data recorded. The drug history was also recorded. The patients were sent to the Central service laboratory for Alanine transaminase, Aspartate transaminase and Alkaline phosphatase enzyme levels. These enzymes are measured using EM ERBA 360 auto analyzer using ERBA reagent system packs which are compatible with the International Federation of Clinical Chemistry. The results obtained were analyzed for one way ANOVA to determine whether there are any significant differences between the means tobacco users versus non users; and for alcohol users versus non users using SPSS 16 software.

3. Results

The general characteristics of the population are given in table 1. The population under study is of middle aged rural population with more females than males. Most of them consumed mixed diet and the average BMI were normal. The population is divided in to two groups as tobacco and non tobacco users and significance between differences of various parameters in respect to tobacco use are given in table 2. We found a significant increase in systolic and Diastolic blood pressure and increased ALT in tobacco users with respect to non tobacco users. Also we found significant increase in the same parameters among people who consume alcohol than non alcoholics (Table 3).

Table 1: General characteristics of the study population

S. No	Parameters	Number
1	Age in years	57±8
2	Gender	Males-195 females-290
3	Dietary pattern	Vegetarians-51 Mixed diet- 437
4	History of Diabetes	43
5	History of Hypertension	81
6	Systolic BP mmHg	Mean 126±21
7	Diastolic BP mmHg	Mean 78±12
8	BMI	Mean 24±5
9	ALT levels U/L	Mean 20±7
10	AST levels U/L	Mean 16±6
11	ALP levels U/L	Mean 183±14

Table 2: Comparison of various parameters among tobacco users and non tobacco users using one way ANOVA

Groups/parameters	No	Systolic	Diastolic	ALT values	AST values	ALP values
Tobacco users	114	129 ±22	81±13	22±9	16±6	180±54
Non tobacco users	371	125±21	77±12	19±7	16±6	184±58
P	-	=0.01	=0.02	=0.04	1.37	0.52

Table 3: Comparison of various parameters among alcohol users and non alcohol users using one way ANOVA

Groups/parameters	No	Systolic	Diastolic	ALT values	AST values	ALP values
Alcohol users	153	132 ±10	81±12	22±8	16±6	180±30
Non alcohol users	332	123±15	77±13	18±7	16±6	175±24
P	-	<0.0001	<0.001	<0.001	0.334	0.406

4. Discussion

Our study shows that irrespective of age and dietary status, tobacco and alcohol use affects cardiovascular system by increasing both diastolic and systolic blood pressure as well causing liver failure which can be seen by increasing ALT levels. Snuff increases blood pressure by stimulating sympathetic nervous system causing tachycardia and increasing Catecholamines [18].

It was a well established fact that tobacco consumption in any of the manner increases systolic and diastolic blood pressures, leading to circulatory defects. It is usually presumed that cigarette smokers are more affected than smokeless tobacco users. But studies have clearly said that tobacco in form has equal harmful effects [5, 19]. Our study found that Blood pressure was increased in tobacco users irrespective of the type used.

Smoking yields cytotoxic chemicals [20], which induce oxidative stress associated with lipid peroxidation [21,22]. This leads to activation of stellate cells and development of fibrosis. In addition, smoking increases the production of pro-inflammatory cytokines (IL-1, IL-6 and TNF- α) involved in liver cell injury [23].

Several possible mechanisms have been proposed such as an imbalance of the central nervous system, impairment of the baroreceptors, enhanced sympathetic activity, stimulation of the renin-angiotensin-aldosterone system, increased Cortisol levels, increased vascular reactivity due to increase in intracellular calcium levels, stimulation of the endothelium to release vasoconstrictors and loss of relaxation due to inflammation and oxidative injury of the endothelium leading to inhibition of endothelium-dependent nitric oxide production. Loss of relaxation due to inflammation and oxidative injury of the endothelium by Angiotensin II leading to inhibition of endothelium-dependent nitric oxide production is the major contributors of the alcohol-induced hypertension [24]

Early studies indicated that alcohol consumption increases the ratio of reduced Nicotinamide adenine dinucleotide/oxidized Nicotinamide adenine di-nucleotide in hepatocytes, which disrupts mitochondrial β -oxidation of fatty acids and results in steatosis [25]. Alcohol intake has also been shown to augment the supply of lipids to the liver from the small intestine, increasing mobilization of fatty acids from adipose tissue and uptake of fatty acids by the liver.[25]. In already established hypertension, smoking is associated with an elevated risk for cardiovascular disease; thus quitting smoking is unquestionably among the most important steps patients with elevated BP can take to improve their cardiovascular health [26-28].

Hypertension is rapidly reversible in the majority of heavy drinkers after the withdrawal of alcohol consumption. [29] Similarly most of the adverse effects of alcohol on liver seem to reverse from complete abstinence from alcohol [30]. Not much studies are done regarding the

financial and impacts on health on tobacco use in rural population. Even though government is laying many regulations like label ling tobacco products as harmful and increasing the tax on them, complete ban on tobacco products are required to save the rural population who are the backbone of Indian agricultural Industry.

Limitation

This is a cross sectional study and only reflects the characteristics of only rural population of a specific region. Even though it is very well proved that tobacco in any form and alcohol are detrimental to health, bigger studies with wider sampling are needed to confirm our findings.

Conflict of interest: None

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References

- [1] Global Adult Tobacco survey (GATS), Fact sheet 2009-2010, Government of India. http://www.who.int/tobacco/surveillance/en_tfi_india_gats_fact_sheet.pdf
- [2] Niblock WJ. Cancer in India. *Indian Med Gaz*, 1902; 37: 161-5
- [3] Sanghvi LD & Notani PN (eds.) (1989). Tobacco and Health: The Indian Scene. International Union Against Cancer & Tata Memorial Centre, 1989
- [4] Shafey O, Eriksen M, Ross H, Mackay J. The tobacco atlas, 3rd ed.: Atlanta, Georgia, USA: American Cancer Society; 2009.
- [5] IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. IARC; 2002. Tobacco Smoke and Involuntary Smoking; p. 83.
- [6] Anonymous. Available from Url : http://www.whoindia.org/linkfiles/assessment_of_burden_of_ncd_07-cancer.pdf, accessed on
- [7] Ray R. National survey on extent, pattern and trends of drug abuse in India. New Delhi: Government of India and United Nations Office on Drugs and Crime; 2004. Ministry of Social Justice and Empowerment.
- [8] Benegal V, Gururaj G, Murthy P. Project report on a WHO multicentre collaborative project on establishing and monitoring alcohol's involvement in casualties, 2000-01. Bangalore: NIMHANS; 2002.
- [9] Westman E. Does smokeless tobacco cause hypertension? *South Med J*. 1995; 88:716- 720.
- [10] Eliasson M, Lundblad D, Hagg E. Cardiovascular risk factors in young snuff-users and cigarette smokers. *J Intern Med*. 1991; 230:17- 22.

- [11] Facchini FS, Chen Y-DI, Reaven GM: Light-to-moderate alcohol intake is associated with enhanced insulin sensitivity. *Diabetes Care* 1994; 17:115–119.
- [12] Mayer EJ, Quesenberry CP Jr, Friedman GD and Selby JV: Alcohol consumption and insulin concentrations: role for insulin in associations of alcohol intake with high-density lipoprotein cholesterol and triglycerides. *Circulation* 1993; 88: 2190–2197.
- [13] Andersen BN, Hagen C, Faber OK, Lindholm J, Boisen P, Worning H: Glucose tolerance and B cell function in chronic alcoholism: its relation to hepatic histology and exocrine pancreatic function. *Metabolism* 1983; 32:1029–1032.
- [14] Laws A, Terry RB, Barrett-Connor E: Behavioral covariates of waist-to-hip ratio in Rancho Bernardo. *Am J Public Health* 1990; 80:1358–1362.
- [15] Bjorntorp P: Abdominal fat distribution and disease: an overview of epidemiological data. *Ann Med* 1992; 24:15–18.
- [16] Luther T. Clark: Alcohol-Induced Hypertension: Mechanisms, Complications, and Clinical Implications. *J Natl Med Assoc.* 1985 May; 77(5): 385–389.
- [17] Sharpe PC: Biochemical detection and monitoring of alcohol abuse and abstinence. *Ann Clin Biochem.* 2001, 38: 652-664. 10.1258/0004563011901064.
- [18] Mariann R. Piano, Neal L. Benowitz, Garret A. FitzGerald et al. Impact of Smokeless Tobacco Products on Cardiovascular Disease: Implications for Policy, Prevention, and Treatment. A Policy Statement From the American Heart Association, *Circulation.* 2010; 122: 1520-1544.
- [19] Yuen ST, Gogo AR Jr, Luk IS, Cho CH, Ho JC, Loh TT. The effect of nicotine and its interaction with carbon tetrachloride in the rat liver. *Pharmacol Toxicol* 1995; 77: 225-230.
- [20] Husain K, Scott BR, Reddy SK, Somani SM. Chronic ethanol and nicotine interaction on rat tissue antioxidant defense system. *Alcohol* 2001; 25: 89-97.
- [21] Watanabe K, Eto K, Furuno K, Mori T, Kawasaki H, Gomita Y. Effect of cigarette smoke on lipid peroxidation and liver function tests in rats. *Acta Med Okayama* 1995; 49: 271-274.
- [22] Moszczynski P, Zabinski Z, Moszczynski P Jr, Rutowski J, Slowinski S, Tabarowski Z. Immunological findings in cigarette smokers. *Toxicol Lett* 2001; 118: 121-127.
- [23] Baraona E, Lieber CS. Effects of ethanol on lipid metabolism. *J Lipid Res.* 1979; 20:289–315.
- [24] Kazim Husain, Rais A Ansari, and Leon Ferder, Alcohol-induced hypertension: Mechanism and prevention, *World J Cardiol.* 2014 May 26; 6(5): 245–252.
- [25] Fagard RH. Smoking amplifies cardiovascular risk in patients with hypertension and diabetes. *Diabetes Care.* 2009; 32(Suppl 2):S429–S431. doi: 10.2337/dc09-S354.
- [26] Zanchetti A, Hansson L, Dahlöf B, et al. Effects of individual risk factors on the incidence of cardiovascular events in the treated hypertensive patients of the Hypertension Optimal Treatment Study. HOT Study Group. *J Hypertens.* 2001; 19(6):1149–1159. doi: 10.1097/00004872-200106000-00021.
- [27] Mancia G, Fagard R, Narkiewicz K, et al. 2013 ESH/ESC Guidelines for the management of arterial hypertension. The Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC) *Eur Heart J.* 2013; 34:2159–2219. doi: 10.1093/eurheartj/ehs151.
- [28] Soardo G, Donnini D, Varutti R et al. Effects of alcohol withdrawal on blood pressure in hypertensive heavy drinkers. *J Hypertens.* 2006 Aug; 24(8):1493-8.
- [29] Hulterantz R, Glaumann H, Lindberg G, Nilsson LH. Liver investigation in 149 asymptomatic patients with moderately elevated activities of serum aminotransferases. *Scand J Gastroenterol* 1986; 21:109–113.