

ALCOHOL AND CANCER RISK: A POPULATION BASED COHORT STUDY

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ABSTRACT

Non communicable diseases including cancer are emerging as major health problems in India. The risk factors of the major non-communicable diseases are tobacco, dietary habits, inadequate physical activity and alcohol consumption. The present study undertaken to study the association between alcohol abuse and the risk of various cancers. It was observed that Oral cancer is the most common type of cancer found and the age group 51-60 years is the most affected age group. Cancer types such as oral, oesophagus, parotid, GIT and liver cancers are seen more commonly among alcoholics. There was an definite association between alcohol abuse and development of various cancers. Further studies are required to examine the ways in which the alcohol induces the cancer.

KEY WORDS

Cancer and Alcohol

INTRODUCTION

Non-communicable diseases including cancer are already emerging as major public health problems in India. These diseases are lifestyle related, have a long latent period and need specialised infrastructure and human resource for treatment.¹ The risk factors of the major non-communicable diseases (diabetes mellitus, cardiovascular diseases and many types of cancer) are tobacco, dietary habits, inadequate physical activity and alcohol consumption. With the control of infectious diseases and increased longevity of the growing population in a country like India, the spectrum of disease changes and the burden of cancer are on the increase.² It is estimated from the population census data for India in 1991 that over 609,000 new cancer cases were estimated to have been diagnosed in the country. This figure had increased to 806,000 by the turn of the century. The estimated age standardised rates per 100,000 were 96.4 for males and 88.2 for females.³ The most common cancers found in males were cancers of the lung, pharynx, oesophagus, tongue and stomach while among females cancers of the cervix, breast,

ovary, oesophagus and mouth were common.⁴ Globally it is estimated that Cancer kills an estimated 526,000 Americans yearly, second only to heart disease. Cancers of the lung, large bowel, and breast are the most common in the United States.

Considerable evidence suggests a strong connection between heavy alcohol consumption and increased risk for cancer, with an estimated 2 to 4 percent of all cancer cases thought to be caused either directly or indirectly by alcohol. A strong association exists between alcohol use and cancers of the oesophagus, pharynx, and mouth, whereas a more controversial association links alcohol with liver, breast, and colorectal cancers.⁵ The Epidemiologic research has also shown a dose-dependent association between alcohol consumption and certain types of cancer; as alcohol consumption increases, so does risk of developing certain cancers. More tenuous results have come from research into the mechanism by which alcohol could contribute to cancer development.⁶ An honest effort was made to study

the incidence and relation between alcohol consumption and cancer.

MATERIALS AND METHODS

The study was carried out on 400 patients with cancer admitted at department of Oncology Attavar Hospital, Mangalore, (Karnataka State) and Santosh medical college, Ghaziabad, (U.P) with history of Alcoholism. The subjects included in the study consumed alcohol for a minimum period ten years with minimal intake of 90 ml per day.

The study subjects were given with verbal and written information about the study prior to obtaining written consent and invited for verbal and written feedback of individual results at the end of the study. The subject were screened for cancer based on Clinical history, and procedures and tests such as endoscopy, x-rays, MRI or ultrasound imaging techniques. Laboratory tests, such as the Pap smear or Aspiration cytology tests were employed for detection of specific cancers.

RESULTS AND DISCUSSION

Table No 1: Distribution of Study Population According to Age and Type of Cancer

Sl No	Organ Related Tumours	Number of cases	Age Group with percentage						
			Birth-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	61-70 yrs	71 & above
1	Oral	102	1(1.0)	1(1.0)	6(5.9)	27(26.5)	28(27.5)	26(27.5)	11(10.6)
2	Breast	73		3(4.1)	29(39.7)	13(17.8)	18(24.7)	8(11.0)	2(2.7)
3	Cervix	73		2(2.7)	15(20.6)	19(26.0)	24(32.9)	10(13.7)	3(4.1)
4	Non-Hodgkin's Lymphoma	25	7(28.0)	7(28.0)	1(4.0)	7(28.0)	2(8.0)		1(4.0)
5	Oesophagus	24			2(8.3)	7(29.2)	7(29.2)	2(8.3)	6(25.0)
6	Ovary	19			2(10.5)	10(52.6)	6(31.6)	1(5.3)	
7	Lung	11			1(9.1)	2(18.2)	5(45.4)	2(18.2)	1(9.1)
8	Leukaemia	10	6(60.0)	1(10.0)	2(20.0)	1(10.0)			
9	Brain	9	3(33.3)		4(44.5)	2(22.2)			
10	Parotid	8		2(25.0)		2(25.0)	3(37.5)	1(12.5)	
11	GIT	8			1(12.5)	2(25.0)	2(25.0)	3(37.5)	
12	Uterine	7			1(14.3)	3(42.8)	2(28.6)		1(14.3)
13	Multiple Myeloma	6			3(50.0)		1(16.7)		2(33.3)
14	Liver	5			2(40.0)			3(16.0)	
15	Thyroid	5		2(40.0)		1(20.0)	1(20.0)	1(20.0)	
16	Kidney	4	2(50.0)					2(50.0)	
17	Lymphoma	3			1(33.3)		2(66.7)		
18	Prostate	3							3(100)
19	Bladder	2				1(50.0)		1(50.0)	
20	Vagina	2					1(50.0)	1(50.0)	
21	Testis	1		1(100)					

Table No 2: Distribution of Study Population According to Alcoholics and type of cancer

SI No	Organ Related Tumours	Number of cases	Number of Alcoholics and percentage
1	Oral	102	49(48.03)
2	Breast	73	Nil
3	Cervix	73	Nil
4	Non-Hodgkin's Lymphoma	25	2(8.0)
5	Oesophagus	24	11(45.8)
6	Ovary	19	Nil
7	Lung	11	7(63.6)
8	Leukaemia	10	Nil
9	Brain	9	1(11.11)
10	Parotid	8	4(50.0)
11	GIT	8	4(50.0)
12	Uterine	7	Nil
13	Bones(Multiple Myeloma)	6	2(33.3)
14	Liver	5	3(60.0)
15	Thyroid	5	1(20.0)
16	Kidney	4	1(25.0)
17	Lymphnodes(Lymphoma)	3	Nil
18	Prostate	3	1(33.3)
19	Bladder	2	1(50.0)
20	Vagina	2	Nil
21	Testis	1	Nil

It was observed that, oral cancer was the most common type of cancer found and age group 51-60 years was the most affected age group. Cancer types such as oral, oesophageal, parotid, GIT, Lung, liver and Bladder cancers were seen more commonly among alcoholics. Although some of the epidemiologic data provide little insight into whether or how alcohol increases the risk for various cancers. For some cancers, such as mouth and oesophageal, alcohol is thought to play a direct causal role. For others, such as liver and breast cancers, alcohol is thought to play an indirect role by enhancing mechanisms that may cause cancer.⁷ Studies looking at these direct and indirect mechanisms may shed light on alcohol's role in developing cancers. The strongest link between alcohol and cancer involves cancers of the upper digestive tract, including the oesophagus, the mouth, the pharynx, and the larynx. Less consistent data link alcohol consumption and cancers of the liver, breast, and colon.⁸ Although

there is no evidence that alcohol itself is a carcinogen, alcohol may act as a co carcinogen by enhancing the carcinogenic effects of other chemicals. In humans, the risk for mouth, tracheal, and oesophageal cancer is 35 times greater for people who both smoke and drink than for people who neither smoke nor drink, implying a co carcinogenic interaction between alcohol and tobacco-related carcinogens.⁹

Alcohol's co carcinogenic effect may be explained by its interaction with certain enzymes. Some enzymes that normally help to detoxify substances that enter the body can also increase the toxicity of some carcinogens.¹⁰ One of these enzymes is called cytochrome P-450. Dietary alcohol is able to induce cytochrome P-450 in the liver, lungs, oesophagus, and intestines, where alcohol-associated cancers occur. Subsequently, carcinogens such as those from tobacco and diet can become more potent as they, too, pass through the oesophagus, lungs, intestines, and liver and encounter the activated enzyme.¹¹

These are some of the possible theories for higher incidence of cancer in alcoholic:

1. Suppression of Immune Response.

Alcoholism has been associated with suppression of the human immune system. Immune suppression makes chronic alcohol abusers more susceptible to various infectious diseases and, theoretically, to cancer.¹²

2. Alcohol as carcinogenic effect: It may be explained by its interaction with certain enzymes. Some enzymes that normally help to detoxify substances that enter the body can also increase the toxicity of some carcinogens.¹³

CONCLUSION

Although it is clear that there is association between alcohol consumption and development of certain types of cancer, study findings are often inconsistent and may vary by country and by type of cancer. The key to understanding the association lies in research such as studies which examine the metabolic effects of alcohol at the cellular and genetic levels. Research examining the ways in which alcohol may induce cancers has found some potential mechanisms, the most promising of which implicates oncogenes.

REFERENCES

- (1) American Cancer Society. *Cancer Facts and Figures*. Atlanta, GA: American Cancer Society, 1993.
- (2) Rothman KJ. The proportion of cancer attributable to alcohol consumption. *Prev Med* 1980;9(2):174-9.
- (3) International Agency for Research on Cancer. *IARC Monographs on the Evaluation of Carcinogenic Risks to*

Humans. Vol. 44. United Kingdom: World Health Organization, 1988.

- (4) Klygis, L.M., and Barch, D.H. The role of ethanol in esophageal carcinoma. In: Watson, R.R., ed. *Alcohol and Cancer*. Boca Raton, FL: CRC Press, 1992. pp. 73-89.
- (5) Blot WJ. Alcohol and cancer. *Cancer Res* 1992;52(7 Suppl):2119s-2123s.
- (6) Stinson FS, DeBaakey SF. Alcohol-related mortality in the United States, 1979-1988. *Br J Addict* 1992;87(5):777-83.
- (7) Franceschi, S., and La Vecchia, C. Ethanol and risk of cancer of the oral cavity, pharynx, and esophagus. In: Watson, R.R., ed. *Alcohol and Cancer*. Boca Raton, FL: CRC Press, 1992. pp. 119-134.
- (8) Takada, A.; Takase, S.; and Tsutsumi, M. Alcohol and hepatic carcinogenesis. In: Yirmiya, R., and Taylor, A.N., eds. *Alcohol, Immunity, and Cancer*. Boca Raton, FL: CRC Press, 1993. pp. 187-209.
- (9) Villa, E.; Melegari, M.; and Manenti, F. Alcohol, viral hepatitis, and hepatocellular carcinoma. In: Watson, R.R., ed. *Alcohol and Cancer*. Boca Raton, FL: CRC Press, 1992. pp. 151-165.
- (10) Mufti, S.I. Alcohol and cancers of the esophagus and liver. In: Yirmiya, R., and Taylor, A.N., eds. *Alcohol, Immunity, and Cancer*. Boca Raton, FL: CRC Press, 1993. pp. 159-186.
- (11) Garro AJ, Lieber CS. Alcohol and cancer. *Annu Rev Pharmacol Toxicol* 1990;30:219-49.
- (12) Roselle G. Alcohol and the immune system. *Alcohol Health & Res World* 1992;16(1):16-22.
- (13) Farinati F, Lieber CS, Garro AJ. Effects of chronic ethanol consumption on carcinogen activating and detoxifying systems in rat upper alimentary tract tissue. *Alcohol Clin Exp Res* 1989;13(3):357-60.



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