



**RESEARCH ARTICLE**

**ALCOHOL AND GASTRIC CANCER IN THE RESIDENTS OF WEST BENGAL**

**<sup>1</sup>\*Ashis Kumar Saha, <sup>1</sup>Nirmalya Roy and <sup>2</sup>Subhas Chandra Hazra**

<sup>1,2</sup>Department of General Medicine, K P C Medical College & Hospital, Jadavpur

**ARTICLE INFO**

**Article History:**

Received 14<sup>th</sup>, December, 2014

Received in revised form 23<sup>th</sup>, December, 2014

Accepted 13<sup>th</sup>, January, 2015

Published online 28<sup>th</sup>, January, 2015

**Key words:**

Endoscopy, alcohol, gastric carcinoma, residents, West Bengal

**ABSTRACT**

This study discovers the association of alcohol with gastric carcinoma in the residents of West Bengal. Total 28860 patients (alcoholic 11532, Nonalcoholic 17328) were interviewed before endoscopy. Among alcoholics, wine and liquor intakers were 7919 and beer and other beverages consumers 3613. Among 542 gastric cancer cases, wine and liquor intakers were 280 and other beverage intakers 68. Comparisons were done to know the incidence of alcoholics and non alcoholics in total number of patients, influence alcohol intake on gastric carcinoma, number of pegs of alcohol per day on gastric carcinogenesis and influence of different types of alcoholic beverages on gastric carcinoma. Wine and liquor intakers, earlier starters of alcoholic beverages significantly ( $P < 0.0001$ ) suffered from gastric carcinoma. Heavy drinkers were mostly affected ( $P < 0.0001$ ). There were strong associations between wine and liquor intakers and gastric carcinoma in West Bengal.

© Copy Right, IJRSR, 2014, Academic Journals. All rights reserved.

**INTRODUCTION**

Second most common cause of cancer death after lung cancer in the world is adenocarcinoma of stomach (Peter Boyle *et al*, 2008). In males and females gastric cancer is the 2<sup>nd</sup> and 4<sup>th</sup> common cancer respectively (Danaei *et al*, 2005, Catalano *et al*, 2009). Case fatality ration of the cancer is higher than colon, breast and prostate cancer (Jemal *et al*, 2011). Japan, China, Korea, Central and South America are the highest risk areas; whereas, Southern Asia, North America and Africa are the low risk areas from the epidemiological point of view (Parkin *et al*, 2005). Smokers, tobacco chewers, alcoholics and high intakers of salted and prickled foods are at highest risk of gastric cancer (IARC 2004).

But some studies denied this observation (Ray *et al*, 2007, Bagnard *et al*, 2001). Genetic and environmental factors interact with each other in the development of gastric cancer. Among the genetic factors, polymorphism are seen in the inflammatory cytokine and xenobiotic metabolic genes, whereas, among environmental factors, tobacco smoking and chewing, alcohol consumption, high intake of salted and prickled foods and lack of refrigeration seem to play major roles (Correa *et al*, 2005; La Torre *et al*, 2005).

Our present study was to observe an association of drinking of alcohol and the development of gastric carcinogenesis and to update with the systemic review of the available epidemiological data on the relationship between alcohol drinking and gastric carcinogenesis published till date.

**MATERIALS AND METHODS**

We started our original and honest study on the relationship of alcohol drinking and the gastric carcinogenesis only after getting permission from our ethical committee. This was our extensive seven years study. Total 28860 patients from different districts from West Bengal, like, Malda, Nadia, North and South 24 parganas, Howrah, Hoogly, Midnapore and Kolkata, were sent for upper gastrointestinal endoscopy for evaluation of different presenting symptoms. After taking informed consent from all the patients' parties, all the subjects were interviewed by the trained interviewer to collect demographic data, like, age, sex and religion, and "Substance use data" of alcohol using a structured standard questionnaire. "Alcohol intake" history included: 1. Type of alcohol intake, 2. Age at which drinking has been started, 3. Number of years of drinking, 4. Numbers of pegs per day. Endoscopy was performed using 15% xylocaine as local anesthesia. During the procedure, eight bits of tissues were taken from suspected lesion in any area of stomach and was sent for histopathological examination fixed in 10% formalin at room temperature.

**Statistics**

Analyses were done at 95% confidence interval to get the probability value (p-value) to detect the level of significance. Median value with standard deviation were also calculated to detect the age at which drinking has been started, numbers of years of drinking, number of pegs per day.

95% CI for difference of percentage:

\*Corresponding author: **Ashis Kumar Saha**

Department of General Medicine, K P C Medical College & Hospital, Jadavpur

$(p_1 - p_2) \pm 1.96SE (p_1 - p_2)$ , where  $SE (p_1 - p_2) = \left\{ \frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2} \right\}^{1/2}$

Calculations were done by using Graphic pad software.

**RESULTS**

Total 28860 patients were underwent endoscopic procedure, of which, 11532 were alcoholic and 17328 non-alcoholic. Alcoholic patients were significantly affected than non-alcoholics ( $p < 0.0001$ ) [Table I]. Early starter of alcohol ( $34.5 \pm 12.8$  vs.  $25.6 \pm 6.5$ ,  $p < 0.0001$ ), long time drinker ( $21.9 \pm 9.3$  vs.  $32.6 \pm 9.6$ ,  $p < 0.0001$ ) and heavy drinkers ( $3.6 \pm 4$  vs.  $6.2 \pm 8.8$ ,  $p < 0.0001$ ) were significantly affected [Table II]. Again, wine and liquor drinker were significantly affected than other beverages including beer drinker ( $p < 0.0001$ ) [Table III].

beer and other beverages (Nutrition Research Newsletter, 1994) though previous studies revealed inconsistent results (Gajalakshmi *et al*, 1996; Rao *et al*, 2002). On the other hand, a prospective study in China showed positive association of heavy alcohol consumption with gastric carcinoma in men (HR= 1.46 (95% CI 1.05 – 2.04), similar results were demonstrated in men from European prospective investigation into Cancer and Nutrition (EPIC) study (HR= 1.65(95% CI 1.06 – 2.58) (Duell *et al* 2011) Our observations demoed that heavy alcohol consumption accelerated the risk of gastric cancer; this observation agreed the above studies which showed the strong association heavy alcohol drinking and the risk of gastric cancer. Our studies also depicted that wine liquor consumers suffered most from gastric cancer than beer

**Table I** Incidence of gastric carcinoma in alcoholic and nonalcoholic (n=28860)

Alcohol intake	Total no. of patients undergoing endoscopy	Total numbers affected	% affected	95% Confidence interval	P value
Alcoholic	11532	348	3.01	0.79 – 0.97	<.0001
Non alcoholic	17328	194	1.11		

**Table II** Among the alcoholic person (11532) -- Mean±SD

Criteria of alcohol intake	Persons not affected (11184)	Persons affected (348)	95% Confidence interval (assumed equal variances)	95% Confidence interval (assumed unequal variances)	t- test for equal variances (assumed)	t- test for unequal variances (assumed)	P value
Age at which alcohol drink started	34.5±12.8	25.6±6.5	7.55, 10.25	8.18, 9.62	12.91	24.12	<0.0001
Number of years of drinking	21.9±9.3	32.6±9.6	-11.69, -9.71	-11.75, -9.67	- 21.11	- 20.49	<0.0001
Number of pegs per day	3.6±4	6.2±8.8	-3.05, -2.15	-3.53, -1.67	-11.306	-5.49	<0.0001

**Table III** Comparison o Different types of beverages in the affected patients (348 alcoholic)

Types of beverages	Exposed patients 11532	Affected patients 348	95% Confidence interval	P value
Wine & liquor	7919	280	0.01, 0.02	<0.0001
Other beverages Including beer	3613	68		

**DISCUSSION**

Gastric cancer, though one of most common cancers throughout the world, its pathogenesis and molecular genetics responsible for its development has been poorly evaluated. According to different literatures worldwide, alcohol may be carcinogenic to esophagus and cardia, but not to distal part of the stomach. Similarly, studies in Mumbai failed to show alcohol as a risk factor for gastric cancer. In Indian subcontinent, due to social stigma, it is usually not possible to measure the amount of alcohol intake in an individual. Segi *et al* demonstrated that heavy drinkers suffered most from stomach cancer as compared to controls (Segi *et al*, 1957), which, on the other hand, were not supported by the prospective study performed by Hirayama (Hirayama 1971). Wynder *et al* in their studies conducted in Japan and other three countries as well as Gajalakshmi *et al* in India demoed no significant relation of either type or quantity of alcohol consumption with the gastric cancer as compared to control (Wynder *et al*, 2005; Gajalakshmi *et al*, 1996). On the other hand, in a case control study, performed in Chennai, South India, alcohol consumption were demoed as significant risk factor (Sumathi *et al*, 2005) and few other studies showed it as weak risk factors (Pisters *et al*, 2005; Correa *et al*, 2005; La Torre *et al*, 2005). But in our study, alcohol consumers were detected as significant sufferers from gastric cancer than non-consumers.

In the country of heavy consumption of alcohol in the world, Italy, heavy consumers of wine and liquor suffered from gastric carcinoma, but, there is no association observed with

and other beverages consumers, which was similar to the studies performed in Mexico as well as Portugal (Lopez-Carrilo *et al*, 1998; Falcao *et al*, 1994), but no association was found with spirits (Zickutte *et al*, 2005). Our study also demonstrated strong association of heavy, long time drinkers and early starters with gastric cancer.

Several mechanisms were proposed in the pathogenesis of gastric cancer in relation to alcohol. The principal ingredient of alcohol beverages is carcinogenic because of the following reasons (Lachenmeier *et al*, 2009): Firstly, many oxygen species and oxidative stress induced by ethanol damage DNA and also affect their repair. Secondly, in case of heavy alcohol consumers, induced cytochrome 450 2E1 (CYP2E1) in various in the body affect conversion of procarcinogens (present in alcoholic beverages, tobacco smoke, diet) into carcinogens (Seitz *et al*, 2007; Purohit *et al*, 2005). Thirdly, ethanol acts as solvent for these carcinogens and aids in entering into the cells in the stomach mucosa to produce their direct toxic effects ((Seitz *et al*, 2007). Fourthly, in the body, alcohol will be converted into acetaldehyde by alcohol with the help of alcohol dehydrogenase and CYP2E1, which, in turn, starts point mutation by inducing sister-chromatid exchanges, impairs DNA repair, induces epithelial metaplasia and forms mutagenic adducts with DNA (Purohit *et al* 2005).

**CONCLUSION**

Alcoholics were mostly affected from gastric cancer. Wine and liquor showed strong association than beer and other beverages in the genesis of gastric cancer. Early beginners of

alcohol, heavy and long time consumers were suffered most from gastric cancer.

## References

1. Peter Boyle, Bernard Levin (eds.)(2008). World Cancer Report 2008. IARC. Lyon 2008.
2. Danaei G, Vander Hoorn S, LopezAD, Murray CJ, Ezzati M. Causes of cancer in world: Comparative risk assessment of nine behavioral and environmental risk factors. *Lancet*2005;366:1784-1793
3. Catalano V, Labianca R, Beretta GD, Gatta G, de Braud F, Van Cutsem E. Gastric cancer. *Crit Rev Oncol Hematol* 2009;71:127-164
4. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin* 2011;61:61-90
5. Parkin DM, Freddie Bray, Ferlay J *et al* (2005). Global cancer statistics, 2002. *CA Cancer J Clin*;55:74-108
6. IARC (2004).Tobacco smoke and involuntary smoking, IARC monographson the evaluation of carcinogenic risksto humans, 83.
7. Ray G, Dey S, Pal S. Epidemiological features of gastric cancer in a railway population in Eastern India. *J Assoc Physicians India* 2007;55:247-249
8. Bagnard V, Blangiardo M, La Veechia C, Corrao G. A meta-analysis of alcohol drinking and cancer risk. *Br J Cancer* 2001;85(11):1700-1705
9. Correa P, Schneider BG: Etiology of gastric cancer: What is new? *Cancer Epidemiol Biomarkers Prev*;14: 1865-1868, 2005.
10. La Torre G, Boccia S, Ricciardi G: Glutathione S-transferase M1 status and gastric cancer risk: a meta-analysis. *Cancer Lett*, 217:53-60,2005.
11. Segi M, Fukushima I, Fujisaku S *et al*. Epidemiological study on cancer on Japan. *Gann* 1957;48(suppl.):1-63.
12. Hirayama T. Epidemiology of stomach cancer. *Gann Monogr* 1971;11:3-19.
13. Wynder E L, Kmet J, Dengal N, Segi M. An epidemiological investigation of gastric cancer. Cancer Institute (WIA), Chennai.
14. Gajalakshmi CK, Shanta V. Lifestyle and risk of stomach cancer. A hospital based case-control study. *Int J Epidemiol*. 1996; 25:(146-53) [PubMed]
15. Sumathi B, Ramlingam R, Shanta V, *et al*. (2005). Cancer incidence and mortality in Dindigul district in Tamilnadu 2003. Cancer Institute (WIA), Chennai.
16. Pisters P, Kelson D, Powell S, Tepper J. Cancer of the stomach. In: Devita VT, HellmanS, Rosenberg SA, editor. *Cancer: Principles and practice of oncology*. 7<sup>th</sup> ed. Philadelphia, USA:Lipincott Williams & Wilkins;2005, p.909-944
17. Alcohol and stomach cancer in Northern Italy. *Nutrition Research Newsletter*. Sept 1994 V13 n9 P103.
18. Rao DN, Ganesh B, Dinshaw KA, Mohandas KM. A case-control study of stomach cancer in Mumbai, India. *Int J Cancer* 2002;101:380-384.
19. Duell EJ, Travier N, Lujan-Barroso L *et al*. Alcohol consumption and gastric cancer risk in the European Prospective investigation into Cancer and nutrition (EPIC) cohort. *Am J Clin Nutr*. 2011 nov, 94(5):1266-75.
20. Lopez-Carrilo L, Lopez-Cervantes M, Ramirez-Espitia A, Rueda C, Fernandez-Ortega C, Orozco-Rivadeneira S: Alcohol consumption and gastric cancer in Mexico. *Cad saude Publica* 1998, 14(Suppl 3): 25-32.
21. Falcao JM, Dias JA, Miranda AC, Leitao CN, Lacerda MM, daMotta LC: Red wine consumption and gastric cancer in Portugal: a case control study. *Eur J Cancer Prev* 1994;3:269-276.
22. Zickute J: Evaluation of gastric cancer risk factors in Literature.PhD thesis. Lithuanian: Kaunas Medical University; 2005. Lithuanian.
23. Lachenmeier DW, Kanteres F, Reham J: Carcinogenicity of acetaldehyde in alcoholic beverages: risk assessment outside ethanol metabolism.*Addiction* 2009,104:533-550.
24. Seitz HK, Stickel F; Molecular mechanism of alcohol mediated carcinogenesis. *Nat Rev Cancer* 2007, 7(8):599-612.
25. Purohit V, Khalsa J, Serrano J: Mechanisms of alcohol associated cancers: Introduction and summary of the symposium *Alcohol* 2005;35:155-160.

\*\*\*\*\*