



**RESEARCH ARTICLE**

**RISK FACTORS ANALYSIS OF SQUAMOUS CELL CARCINOMA (SCC) ESOPHAGUS IN NORTH INDIAN FEMALES IN TERTIARY CARE HOSPITAL: A CASE –CONTROL STUDY**

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**ABSTRACT**

**Background:** Incidence of Squamous cell carcinoma esophagus has increased over last few decades , it is more common in man exposed to certain risk factor mostly chronic smoking and alcohol intake. The sole risk factors for Squamous Cell Carcinoma(SCC) in non smoker females have not been studied. **Aims:** To study the risk factors of Squamous Cell Carcinoma among females patients and compared with age- matched female controls without SCC in the Northwest part of India. **Setting and design:** Hospital based case –control study. **Materials and Methods:** A total of 80 females subjects were included (39 SCC patients and 41 age-matched controls without SCC). The participants were selected from the gastroenterology unit CMC and Hospital, Ludhiana. They were interviewed by trained medical interns using questionnaire before subjecting them into an endoscopy .**Results:** Patients with SCC are older than control group. The number of cups of beverage per day have essentially put the subjects at risk (i.e higher the frequency of intake of beverage in a day , more the risk of developing SCC esophagus) in our study( $p=0.0045$ ) .The occurrence of SCC has increased when the number of cups per day has exceeded beyond 3 or more .The Sikh female are higher risk of developing SCC than other religion. **Conclusion:** Number of cups of per day intake of beverage has posed the subjects at risk, so avoidance of frequent and hot beverage intake for the risk population should be advised. Efforts for controlling the burden of SCC (esophageal squamous cell carcinoma) should focus on reducing the risk factors.

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**INTRODUCTION**

Oesophageal carcinoma affects more than 450 000 people worldwide and the incidence is rapidly increasing. Squamous-cell carcinoma is the predominant form of oesophageal carcinoma worldwide, but a shift in epidemiology has been seen in Australia, the UK, the USA, and some western European countries (eg, Finland, France, and the Netherlands). The overall 5-year survival of patients with oesophageal carcinoma ranges from 15% to 25%. Diagnoses made at earlier stages are associated with better outcomes than those made at later stages (5,6).

Incidence of SCC esophagus has increased. It is commoner in males exposed to certain risk factor mostly chronic smoking and alcohol intake (1). People between the ages of 45 and 70 have the highest risk of esophageal cancer. Men are three to four times more likely than women to develop esophageal cancer. Black are twice more likely to develop the squamous cell type of esophageal as compared to white people. Using any form of tobacco including cigarettes, cigars, pipes, chewing tobacco, and snuff raises the risk of esophageal cancer, especially squamous cell carcinoma. Heavy drinking over a long period of time increases the risk of squamous cell

carcinoma of the esophagus, especially when combined with tobacco use. Individualized prognosis depends largely on stage. Those with cancer restricted entirely to the esophageal mucosa have about 80%, 5 year survival rate. Submucosal involvement brings this down to less than 50%. Extension into the muscularis propria (muscle layer of the esophagus) suggests a 20% 5 year survival rate, and extension to the structures adjacent to the esophagus predict a 7% 5 year survival rate. Patients with distant metastases (who are not candidates for curative surgery) have a less than 3% 5 year survival rate (8).

However, the causes or and risk factors for SCC esophagus in female have not been studied or elucidated. Female neither smoke nor drink alcohol in this part of the country. Why these females are becoming the prey of such devastating SCC which reduces their life expectancy. We studied the etiologic factors in the females having esophageal SCC inhabitants of the north west part of India.

**MATERIALS AND METHODS**

This study was conducted from January 2010 to November 2014 in the department of Gastroenterology and Hepatology unit, Christian Medical college and Hospital, Ludhiana, Punjab

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.Those female patients presented to hospital with features of progressive dysphagia, weight loss and loss of appetite. They were subjected for an upper G.I. endoscopy and a growth in the esophagus was documented. Multiple biopsies from growth was taken and sent for histological examination. Once biopsy report came as malignancy (i.e. SCC), these patients were labeled as cases. Site of the growth were noted separately. Those female patients presenting with dyspepsia, epigastric pain with or without dysphagia and those having normal endoscopy were taken as controls.

Detail history was taken, through clinical examination was done. Weight was recorded in kilograms and height was measured in centimeters. Detailed demographic characteristics of all subjects were also noted. 39 SCC patients and 41 age-matched controls were enrolled. They were interviewed by trained medical interns using predesigned questionnaire before subjecting them to endoscopy. Subjects with history of smoking and alcohol intake were excluded from the study.

### Statistical analysis

The data were entered in Microsoft excel and data was analyzed using Epidata Analysis 2.2.2 and Epi Info 3.5.4 softwares. Chi-square, and in dependent *t*-test. Were performed and  $p < 0.05$  was considered statistically significant.

The most of case and control are in the age group of 40 -69 years, mean  $57.13 \pm 12.08$ , but cases are older than the controls where the age itself is a risk factor for any kind of internal malignancy (Table-1). *Mean BMI of cases are 21.97 and that of control are 26.19. The cases are having low BMI as compared to control which is statistically significant ( $p=0.0006$ ) that low BMI in cases may be due to loss of appetite and dysphagia. Food habits and hot or cold condition of beverage intake (tea, coffee etc) in our study has no significant association with squamous cell carcinoma, however certain previous studies showed that tea intake is associated with SCC in both sex (9,10,11).*

Four subjects consuming neither tea nor coffee were excluded from this analysis only. The number of cups of beverage per day is statistically significant ( $p=0.0003$ ) where cases are consuming more number of beverage per day as compared to controls. The education in multivariate analysis showed statistically significant which may be multi-factorials (Table-2). Though in our study most of the case and control attained either primary or secondary levels of education. *The risk of developing SCC is lower in urban as compared to rural population (OR 0.36 95% CI 0.14, 0.89). In relation to hindus, sikh population was having more SCC (61.1% vs 38.6%) in this study, which requires further evaluation (Table - 1).*

**Table1** Univariate analysis of risk factors.

Risk factors	Cases (n=39)	Controls (n=41)	Odd ratio	P value
Mean Age $\pm$ SD	57.13 $\pm$ 12.09	51.27 $\pm$ 11.41	-	P=0.0285
BMI				
• Normal	24(75.0)	08(25.0)		
• Average	12(57.1)	09(42.9)	-	P=0.0000
• Obese	03(11.1)	24(88.9)		
Food habit - non veg/ Veg	13(48.1)	14(51.9)	0.96	P=0.9307
No. of cups of beverage per day				
2	00 (0.0)	11 (100.0)		
3	19 ( 51.4)	18 (48.6)	-	P=0.0003
4	20 ( 71.4)	08 (20.6)		
Condition of beverage				
• Hot	36 (52.9)	32 (47.1)	1.88	P=0.4085
• Cold	03 (37.5)	05 (62.5)	(0.41-8.48)	
Place of residence				
• Urban	14 (35.9)	25 (64.1)	0.36	P=0.0249
• Rural	25 (61.0)	16 (39.0)	(0.14-0.89)	
Religion				
• Hindu	17 (38.6)	27 (61.4)	-	P=0.0454
• Sikh	22 (61.1)	14 (38.9)		
Education				
• Illiterate	03 (27.3)	08 (72.7)		
• Primary	17 (47.2)	19 (52.8)	-	P=0.2130
• Above primary	19 (57.6)	14 (42.4)		
Source of drinking water				
• Municipal	14 (34.1)	27 (65.9)	0.29	P=0.0074
• Hand pump	25 (64.1)	14 (35.9)	(0.12-0.73)	
Method of purification				
• Boiling	20 (69.0)	09 (31.0)		
• Filter	08 (23.5)	26 (76.5)	-	P=0.0005
• Aquagard	11 (64.7)	06 (35.3)		

## RESULTS

Source of drinking water and method of purification have no association with esophageal SCC (Table-2). Logistic regression

analysis showed significant association of age, body mass index and educational status and number of cups per day with the occurrence of SCC.

of frequent and hot beverage intake for the risk population is advisable.

**Table 2** Logistic regression analysis of risk factors

Term	Odds Ratio	95% C.I.	P-Value
Age	1.0770	1.0012, 1.1585	0.0464
Body Mass Index	0.6034	0.4526, 0.8042	0.0006
Education status	16.1899	2.3962, 109.3860	0.0043
Religion	0.7938	0.1200, 5.2519	0.8107
Residence (Urban vs rural)	0.1438	0.0132, 1.5667	0.1115
Food habit (Non vegetarian / vegetarian)	5.1854	0.7026, 38.2705	0.1066
Beverages (Tea or Coffee)	1.8708	0.0735, 47.6329	0.7045
Number of cups per day	7.4579	1.8626, 29.8615	0.0045
Whether hot or cold	0.3750	0.0242, 5.8152	0.4832
Source of drinking waters	0.2396	0.0286, 2.0038	0.1873
Method of Purification of drinking water	0.9659	0.2900, 3.2175	0.9550

**DISCUSSION**

Oesophageal carcinoma affects more than 450 000 people worldwide and the incidence is rapidly increasing. Squamous-cell carcinoma is the predominant form of oesophageal carcinoma worldwide (1, 7). Esophageal squamous cell carcinoma (ESCC) used to be the dominant type of esophageal malignancy both in Western and Asian countries, where as Esophageal adenocarcinoma (EAC) has been rapidly increasing in Western countries during the past half century, especially in white men. Men are more than 3 times as likely as women to get esophageal cancer(2,3,4). Upper gastro intestinal endoscopy is the best modality investigating and diagnosing the Esophageal Squamous Cell Carcinoma at present modern technology (5, 6.).

Only female patients developing esophageal Squamous Cell Carcinoma were included in this study. These patients neither smoked nor consumed alcohol. They were from low to middle class family and having no family history of esophageal malignancy.

Age group of cases was matched with control group, however age more than 70 was associated with increased incidence as compared to 30-39 years in our study. Hence the cases in our study are older than health controls. The low BMI in cases were due to dysphagia and poor appetite whereas the control group are mostly overweight. The number of cups of beverage per day mostly hot have essentially put the subjects at risk. Hence higher the frequency of intake of beverage in a day, more was the risk of developing SCC esophagus in our study. The incidence of SCC has increased when the number of cups per day has exceeded beyond 3 or more. The Sikh religious female showed higher occurrence of SCC as compared to other religions. Drinking very hot liquids frequently may increase the risk for the squamous cell type of esophageal cancer. This might be the result of long-term damage the liquids do to the cells lining the esophagus.

**CONCLUSION**

The occurrence of squamous cell carcinoma in female population is related to advanced age, however risk is also seen in young females in this study. Number of cups per day intake of beverage has posed the subjects at risk, so avoidance

Efforts for controlling the burden of SCC (esophageal squamous cell carcinoma) should focus on reducing the risk factors, as in general, the prognosis of esophageal cancer is quite poor, because most patients present with advanced disease. By the time the first symptoms (such as difficulty swallowing) appear, the cancer has already well progressed.

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