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RESEARCH ARTICLE

Risk Factor in Carcinoma Esophagus in Punjab Region of North India

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Abstract

Background: World over, esophageal cancer is the seventh most common cancer. It accounts for sixth most common deaths related to cancer. Studies have included various risk factors such as tobacco consumption, unhealthy diet like spicy food, alcohol, and diet deficient in trace elements mostly selenium, alkalinity of soil, genetic variation and low socio-economic status, have been implicated in the etiology of esophageal cancer. **Method:** A descriptive observational study of carcinoma esophagus patients between May, 2019 to October, 2020 was performed. A total of first consecutive 70 patients meeting the eligibility criteria were considered for study. Data was collected by personal interview. **Results:** Data was collected by personal interview. 82.9% of population resided in rural areas. 100% of patients consumed hot beverages with 70% of patients consumed tea, 11.4% consumed coffee and 18.6% consumed both. 60% of patient population used wood for cooking, 22.9% used liquefied petroleum gas (LPG), and 17.1% used cow dung. 25.7% of population consumed cigarette/Bidi, 10% consumed hookah, 7.1% consumed jarda and 28.6% consumed alcohol. 42.9% of patients had pesticide exposure. 47.6% of squamous cell type had pesticide exposure which was statistically significant. **Conclusion:** General public should also be made aware of the harmful effects of consuming spicy, high salt diet and hot beverages along with cigarette smoking and alcohol.

Keywords: Risk factor- esophageal cancer- esophageal neoplasm- spicy food- smoking

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Introduction

Esophageal cancer is seventh most common cancer worldwide. It is sixth most common cause of cancer related deaths. Esophageal cancer is known as fourth most common cause of death in India. It is more prevalent in male than female ratio is 4:1. Approximately, 47,000 new cases are reported each year and the reported deaths reach up to 42,000 each year in India [1]. China north east area to middle east is known as "esophageal cancer belt" due to high incidence of carcinoma esophagus [2].

Risk factors involved in carcinoma esophagus are tobacco consumption, unhealthy diet like spicy food, alcohol [3], tobacco [4] and diet deficient in trace elements mostly selenium, alkalinity of soil, genetic variation and low socio-economic status [4]. Squamous cell carcinoma is predominantly seen in upper two thirds of esophagus unlike Adenocarcinoma, which is seen in lower one third. Squamous cell carcinoma occur due to inflammatory changes that progresses to dysplasia and in situ malignant change. Tobacco smoking is a strong risk factor for esophageal squamous cell carcinoma, but weak risk factor for esophageal adenocarcinoma [4]. The incidence of squamous cell carcinoma is higher in black males as compared to white smoker males [5].

Alcohol consumption is a strong risk factor for esophageal squamous cell carcinoma, but is not a risk factor for adenocarcinoma [3]. Overweight and obesity have been consistently related to esophageal adenocarcinoma, but not to squamous cell carcinoma. Body mass index seems to be inversely related to the risk of esophageal squamous cell carcinoma. The influence of obesity on esophageal adenocarcinoma may be related to higher incidence of gastroesophageal reflux in obese persons

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since the risk of gastroesophageal reflux is strongly related to the risk for Barrett's esophagus [6].

Infection with H.pylori is protective to adenocarcinoma, but might be a risk factor for squamous cell carcinoma, although the role of H.pylori in the etiology of these cancers remains somewhat unclear [7]. Various etiological studies are required to study the risk factors for this lethal cancer. In our observational study we will be studying various risk factors involved in development of carcinoma esophagus.

Materials and Methods

The study has been conducted in tertiary care hospital in Punjab for a period of one and half year. The study conducted was descriptive in nature. The study conducted had inclusion criteria included all patient with age more than 18 years and histologically proven cases of carcinoma esophagus. Those patient having tumour in any other part of body or those who doesn't want to part of the study. Total 70 patient were included in our study. A non probability convenient sampling method has been adopted. A total of first consecutive 70 patient meeting inclusion criteria will participate into the study. Data was collected by by personal interview Complete history, physical examination and clinical evaluation will be done.

Data will be collected by personal interview and will be assessed and reviewed for clinic-demographic information such as age, sex, residence, dietary habits, tobacco or alcohol consumption, performance score, presenting symptoms and signs, and their correlation with disease parameters such as tumour location and histology of the disease. Other investigation such as upper gastrointestinal endoscopy, and contrast-enhanced computed tomography chest/ upper abdomen will be done. Routine investigation will be done on patient such as Hb, TLC, DLC, B. urea and S creatinine. All investigation will be done with proper written consent as appropriate. The data regarding patient particulars, diagnosis and investigation will be collected in a specially designed case recording form. Data would be tabulated and analysed by various statistical methods regarding patient particulars, diagnosis and investigation will be collected in a specially designed case recording form.

Data Analysis Plan

Categorical variables are presented in number and percentage, and analysed using a Chi-square ($\chi 2$) test. Continuous variables that are presented as a mean ± Standard Deviation (SD) compared using unpaired t-test and Mann Whitney U test for multiple variables. P values <0.05 were considered significant. All analyses were performed using the SPSS statistical software program (IBM SPSS Statistics Grad Pack 23.0 for Windows; Armonk, NY).

Results

In our study, mean age of patients was 55 years and highest numbers of patients (38.6%) were present in sixth decade followed by seventh decade (25.7%). In our study, 47.1% of patients were males and 52.9% were females. (Table 1) 39.4% of males and 37.8% of females were in 51-60 years of age group followed by 30.3% of males and 21.6% of females in 61-70 years age group. In our study, maximum of patients (52.7%) were farmers followed by labourers (22.9%). 11.4 % patients were unemployed. (Table 2).

Table 1. Sex Distribution

Sex	Number	%
Male	33	47.10
Female	37	52.90
Total	70	100.00

Table 2. Distribution of Cases According to Occupation

Occupation	N	Percent
Doctor	1	1.4
Driver	3	4.3
Farmer	37	52.9
Labourer	16	22.9
Shopkeeper	1	1.4
Student	1	1.4
Tailor	2	2.9
Teacher	1	1.4
Unemployed	8	11.4
Total	70	100

82.9% of population resided in rural areas (Table 3). 50% of patients consumed non vegetarian diet, 78.6% consumed spicy food, 75.7% consumed high salted diet, 10% of patients had history of smoked food. 100% of patients consumed hot beverages with 70% of patients consumed tea, 11.4% consumed coffee and 18.6% consumed both (Table 4). 60% of patient population used wood for cooking, 22.9% used liquefied petroleum gas (LPG), and 17.1% used cow dung (Table 5). 25.7% of population consumed cigarette/ Bidi, 10% consumed hookah, 7.1% consumed jarda and 28.6% consumed alcohol. 42.9% of patients had pesticide exposure (Table 6). 51.4% were Stage III tumors and 48.6% were Stage IV tumors (Table 7).

57.1% cases of adenocarcinoma had tumour length less than 3 cm whereas 66.7% cases of squamous cell subtype had length between 3-6 cm. The result is statistically significant (Table 8).

Discussion

Esophageal cancer is seventh most common cancer

Table 3. Distribution of Cases According to Residence (N = 70)

Residence	Number
Rural	58 (82.9)
Urban	12 (17.1)

Table 4. Distribution of Cases According to Type of Food Intake

Type of Food intake	Response	N= 70 (%)
Veg (V)/ Non-Veg (NV)	V	35 (50)
	NV	35 (50)
Spicy food	Yes	55 (78.6)
	No	15 (21.4)
High-salted food	Yes	53 (75.7)
	No	17 (24.3)
Smoked food	Yes	7 (10)
	No	63 (90)
Hot beverages	Yes	70 (100)
	No	0 (0)
Type of hot beverages	Tea	49 (70)
	Coffee	8 (11.4)
	Both	13 (18.6)

Table 5. Distribution of Cases According to Type of Fuel Used (N=70)

Fuel used in cooking	Number (%)
Cow dung	12 (17.1)
LPG	16 (22.9)
Wood	42 (60)

Table 6. Distribution According to Pesticide Exposure

Pesticide exposure	N	%
Yes	30	42.90
No	40	57.10

in the world [1]. In present study, we have studied 70 patients who presented to out door patient in tertiary care centre in Punjab.

In our study, 47.1% were males and 52.9% were females. According to 2018 Globocan report, 70% of cases occur in men worldwide [1]. In 2019, Abnet et al reported that esophageal cancer is more common in males (69%) than females (31%) [8]. However, as our study has been done in Punjab region, cancer atlas of Punjab in 2013 report showed slightly higher incidence of esophageal cancer in females as compared to males in Punjab region [9]. Our study results are thus consistent with the region specific reports.

In our study, maximum of patients (52.7%) were farmers followed by labourers (22.9%). 11.4 % patients were unemployed. 82.9% of population resided in rural areas. Similar finding were also noted by Giri et al in their retrospective study of 207 esophageal cancer patients showed that 28.01% were farmers, followed by 19.81% were labourers and housewives and 13.53% were shopkeepers [10]. Also Kapoor et al published in their retrospective study of 10 years of 3,667 esophageal cancer patients, 54% patients were involved in farming activities and 76% of cases came from rural areas [11]. Our study also noted that 42.9% of patients had pesticide exposure.

Dietary characteristics of study population in our study showed, 50% of patients consumed non vegetarian diet, 78.6% consumed spicy food, 75.7% consumed high salted diet, 10% of patients had history of smoked food. 100% of patients consumed hot beverages with 70% of patients consumed tea, 11.4% consumed coffee and 18.6% consumed both. Alike, study conducted in Kashmir showed decreased amount of fruits and vegetables and consumption of salt tea were major risk factors in esophageal carcinoma [12]. Also, study conducted in Jammu also showed poor nutrition, use of salt tea and spicy red chilli as risk factors [13]. We believe that spicy food, high salt diet, consumption of hot beverages particularly tea might be important risk factors for our study population.

60% of patient population used wood for cooking, 22.9% used liquefied petroleum gas (LPG), and 17.1% used cow dung. Smoked food has been previously studied to be important risk factor for esophageal cancer. Although our study population had lower incidence of smoked food, but kitchen smoke due to wood might be a risk factor for esophageal cancer [14].

25.7% of study population consumed cigarette/Bidi, 10% consumed hookah, 7.1% consumed jarda and 28.6% consumed alcohol. Previous studies on Indian population have shown smoking and alcohol as risk factors for esophageal cancer [15]. In our study cases, as there is higher population of females and due to local customs, we have not found high incidence of smoking and alcohol intake. Thus, we conclude that although smoking and alcohol are important risk factors but other factors as discussed above have important role in causing esophageal cancer [16].

In our study, 90% of patients were of squamous cell subtype and 10% were adenocarcinoma. Although the incidence of adenocarcinoma is on rise in western world, but in India, the squamous cell carcinoma is predominant. A study done in Bikaner showed 18% cases had adenocarcinoma and 75.6% had squamous cell carcinoma [11]. A retrospective study of 20 years conducted in Mumbai in 2020 showed squamous cell carcinoma cases to be 80.25% [17]. Our study has also

Table 7. Distribution of Cases According to Stage (N=70)

Stage	Number	Percentage
Stage III	36	51.40
Stage IV	34	48.60
Total	70	100.00

Table 8. Distribution of Cases According to Length of Tumor Compared to Histological Subtype

	Histological subtype	
Length (in cm)	Adenocarcinoma	Squamous
<3	4 (57.1)	11 (17.5)
3-6	2 (28.6)	42 (66.7)
>6	1 (14.3)	10 (15.9)
Total	7	63

P Value, 0.048; consider significant

showed that squamous cell subtype is more prevalent than adenocarcinoma.

In conclusion, hence, it is suggested to the policy makers that more emphasis should be to create awareness about significant negative effects on human health and the environment by the use of wood for cooking and exposure to pesticides.To address these issues, policies can be implemented to reduce the use of wood for cooking and exposure to pesticides.

One approach to reducing the use of wood for cooking is to promote the adoption of clean cooking technologies, such as gas stoves or electric cookers. Governments can provide incentives to households to switch to these cleaner technologies, and provide subsidies to manufacturers to make these technologies more affordable. Similarly, policies can be implemented to reduce pesticide use in agriculture, such as promoting the use of organic farming methods or reducing the import and use of pesticides that have been shown to have harmful effects.

To promote awareness of the risks associated with consuming a high salt and spice diet, smoking and alcohol consumption, public health campaigns can be launched. While there are known risk factors for the development of esophageal cancer, such as tobacco use and heavy alcohol consumption, the exact causes of the disease are not fully understood. As a result, further research is needed to explore the potential relationship between other possible etiological factors and the occurrence of these cancers.

One area of research that is currently being explored is the potential link between diet and esophageal cancer. Some studies have suggested that a diet high in processed and red meat may increase the risk of developing esophageal cancer, while a diet rich in fruits and vegetables may help to reduce the risk. Other dietary factors that are being studied include the consumption of hot beverages, such as tea and coffee, and the use of certain cooking methods, such as grilling and frying.

Overall, while there is much that is still unknown about the etiology of esophageal cancer, ongoing research is helping to shed light on the potential causes and risk factors for the disease. Continued efforts in this area are critical for improving prevention, early detection, and treatment of esophageal cancer, and ultimately improving outcomes for those affected by this disease.

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