

Relationship Between Risk Factors and Dietary Intake of Oesophageal Cancer Patients

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ABSTRACT Cancer is the second leading cause of death in many developed and developing countries of the world. It has thus become major public health problem in the world. Nearly 35-40% of cancers in India are related tobacco chewing. The present study was conducted at Kidwai Memorial Institute of Oncology, Bangalore and Bangalore Institute of Oncology, Bangalore. The subjects of the study were totally 150 from both the hospitals. An attempt has been made to determine the risk factors for oesophageal cancer. The results showed that smoking was high (90.8%) in case of males followed by alcohol consumption (57.4%) while in females chewing betel and tobacco was higher (84.1%) than male subjects (45.9%). Majority of the patients were non vegetarians (previously) and 96.5 per cent of males and 93.6 per cent of the females were vegetarians. Regarding different stages of dysphagia majority of the patients in both (57.3%) were suffering from dysphagia stage III and 38% of the patients in both were suffering from dysphagia stage II and only 4.6% of the patients in both cancer were suffering from dysphagia stage IV. The mean intake of nutrients in both male and female patients were much below the RDA except for calcium. There was a significant difference at 1% level for all nutrients except calcium. The mean per cent adequacy for all nutrients were very less except calcium. Hence, it can be said that tobacco chewing, smoking and alcoholism are the major risk factors. Among alcohol users, smokers and chewers, majority of the patients had BMI less than 16 (CED grade III) i.e., 20.6, 29.8 and 26 per cent respectively when compared to non alcoholics, non-smokers and non-chewers.

INTRODUCTION

Cancer is the most dreaded disease and is the second leading cause of death in many developed and developing countries of the world. Cancer is a complicated multifactorial, multifaceted and multimechanistic disease.

Cancer is an assemblage of neoplastic diseases with devastating impact in terms of mortality as well as physical and psychological morbidity. It is characterised by transformation of cells leading to abnormal unrestrained cellular proliferation. In India, nearly six to seven hundred thousand new cases of cancer are estimated to occur every year with an estimated prevalence of 1.5 to 1.8 million. The age adjusted incidence rates for all types of cancer in India is currently estimated at about 130 per 100,000 in males and 120 per 100,000 in females.

Nutritional and non-nutritional components in the diet seem to influence initiation and promotion of malignant growth. Our daily diet may serve as a source of either a direct or indirect carcinogen (Chandrashekar and Paul, 1989). It may be the route of delivery of carcinogenous substances,

food contaminants and additives Bhatia and Bhide, 1983; Verma et al., 1996; Chetan and Jamuna, 1997; The present investigation was an attempt to find out the dietary intake of cancer patients in terms of intake of nutrients and some risk factors like chewing (betel + tobacco) alcoholism and smoking in relation to cancer.

MATERIAL AND METHODS

The present study was conducted on patients of oesophageal cancer attending the out door clinic in Kidwai Memorial Institute of Oncology, Bangalore and Bangalore Institute of Oncology, Bangalore. 150 oesophageal cancer patients with the age group ranging from 35 to 85 years of both the sex were taken, where most of the patients were come from rural area and were agricultural labourers and coolies.

Interview and questionnaire methods of survey were selected. Information regarding risk factors such as smoking, alcoholism and chewing (tobacco + betel) were collected. The subjects were divided according to different stages of dysphagia. There are 4 stages of dysphagia which

are classified based on the type of food the patient is able to eat.

Data was also collected regarding the type of diet (previous and present) and the dietary intake of nutrients were calculated by using 24 hour recall method on 25 per cent of the total sample size and were compared with the RDA. A set of prestandardised cups and vessels were used to obtain estimates of the amount of raw and cooked food consumed. Similarly different sizes of cardboard discs were used to determine the size of idli/dosa etc. Intake of nutrients were calculated by using food composition tables (Gopalan et al., 1999). The anthropometric measurements recorded were height, weight and BMI was calculated. The data was consolidated and analysed statistically

RESULTS AND DISCUSSION

Risk Factors: Table 1 presents information regarding the risk factors of the subjects. Results showed that 90.8 per cent of the patients among males were smokers. Alcoholic patients from male group were less (57.4%) compare to smokers. Betel and tobacco chewing was more common in females with 84.1 per cent and 45.9 per cent of male patients were chewing betel and tobacco.

Table 1: Classification of risk factors of the subjects

Risk factors	Male (n = 87)		Female (n = 63)	
	Number	(%)	Number	(%)
Smoking	79	90.8	-	-
Alcohol	50	57.4	-	-
Chewing (betel + tobacco)	40	45.9	53	84.1

Type of Diet: Table 2 presents the information on the (previous and present) type of diet of the patients. The results showed that in both males and female patients non vegetarians were more with 66.6 per cent and 57.1 (previous) respectively. Only 33.3 per cent of the patients in

case of males were vegetarians and 42.8 per cent of the female patients were vegetarians (previous). After the occurrence of the disease (present) 96.5 per cent and 93.6 per cent from the male and female patient group were vegetarians and no one patient from both the sexes was found as a non-vegetarian.

Dysphagia Stage: Table 3 shows that more number of patients in both male and female group were suffering from dysphagia stage III with 58.6 per cent and 55.5 per cent respectively, followed by dysphagia stage II with 37.9 per cent in males and 38.0 per cent in female patients. Less number of patients were suffering from dysphagia stage IV with 3.4 per cent in males and little higher in case of female patients with 6.3 per cent. Totally the patients suffering from dysphagia stage III were more (57.3%) following by dysphagia stage II (38%) and dysphagia stage IV (4.6%).

Table 3: Classification of subjects according to different stages of dysphagia

Dysphagia	Male (n = 87)		Female (n = 63)		Total (n=150)	
	N	(%)	N	(%)	N	(%)
Stage I	-	-	-	-	-	-
Stage II	33	37.9	24	38.0	57	38
Stage III	51	58.6	35	55.5	86	57.3
Stage IV	3	3.4	4	6.3	7	4.6

Dietary Intake: Table 4 represents the mean intake of nutrients by made patients of dysphagia stage II and stage III. The mean intake of energy, protein, fat, iron and β -carotene were much below the RDA in both the stages of dysphagia. This could be due to the low consumption of foods like cereals, pulses, green leafy vegetables, roots and tubers and fruits and the patients have problem in swallowing itself which reflected in a lower intake of above mentioned foods. The intake of calcium (423 mg) was adequate in stage III patients it may be due to the fact that majority of the patients who were in the III stage of

Table 2: Classification of subjects according to the type of diet (previous and present)

Type of diet	Previous				Present			
	Male (n = 87)		Female (n = 63)		Male (n = 87)		Female (n = 63)	
	N	(%)	N	(%)	N	(%)	N	(%)
Vegetarian	29	33.3	27	42.8	84	96.5	59	93.6
Non-vegetarian	58	66.6	36	57.1	-	-	-	-

dysphagia, they will be able to take only liquids such as ragi gangi and also majority of the patients staple food was ragi, but in stage II patients intake of calcium (325 mg) was little less than the RDA. The statistical analysis showed that there was a significant difference in 't' value for all the nutrients at 1% level in both stages of dysphagia except for calcium which was non significant. The per cent adequacy of nutrients

in both stages of dysphagia was also depicted in this table. The mean per cent adequacy for all nutrients was very less in both stage patients but for calcium the mean per cent adequacy was 81 per cent in stage II patients and 106 per cent in stage III patients. A special mention should be made for iron which was extremely low with 18 per cent and 13 per cent in stage II and stage III patients respectively. The same was also true for

Table 4: Daily mean intake of nutrients by male subjects

Nutrients	RDA	Dysphagia stage II			Dysphagia stage III		
		Intake mean $\pm$ SD	% Adequacy	't' value	Intake mean $\pm$ SD	% adequacy	't' value
Energy (K.cal)	2875	540.72 $\pm$ 24.18	19	-272.37 **	422.78 $\pm$ 22.23	15	-291.23 **
Protein (g)	60	15.19 $\pm$ 3.24	25	-39.3 **	12.42 $\pm$ 3.03	21	-41.73 **
Fat (g)	20	5.46 $\pm$ 1.27	27	-32.31 **	2.44 $\pm$ 1.06	12	-43.9 **
Iron (mg)	28	5.17 $\pm$ 4.31	18	-15.01 **	3.75 $\pm$ 3.69	13	-17.44 **
Calcium (mg)	400	325.07 $\pm$ 32.5	81	1.0 (NS)	423 $\pm$ 23.3	106	0.3(NS)
β -carotene (mg)	2400	142.54 $\pm$ 15.55	6	-409.7 **	128.05 $\pm$ 24.59	5	-244.03 **

** Significant at 1% level

NS-Non-significant

Table 5: Daily mean intake of nutrients by female subjects

Nutrients	RDA	Dysphagia stage II			Dysphagia stage III		
		Intake mean $\pm$ SD	% Adequacy	't' value	Intake mean $\pm$ SD	% adequacy	't' value
Energy (K.cal)	2225	638.97 $\pm$ 34.67	29	-144.57 **	526.96 $\pm$ 20.19	24	-325.91 **
Protein (g)	50	15.68 $\pm$ 5.82	31	-18.65 **	14.92 $\pm$ 4.26	30	-318 **
Fat (g)	20	5.89 $\pm$ 5.82	29	-30.02 **	2.45 $\pm$ 1.54	12	-45 **
Iron (mg)	30	4.63 $\pm$ 3.06	15	-26.42 **	3.78 $\pm$ 3.13	13	-32.77 **
Calcium (mg)	400	401.04 $\pm$ 24.57	100	0.13 (NS)	410.79 $\pm$ 44.79	102	0.93 (NS)
β -carotene (mg)	2400	122.59 $\pm$ 11.12	5	-648.83 **	129.10 $\pm$ 23.38	5	-375.97 **

** Significant at 1% level

NS: Non; significant

Table 6: Relationship between BMI and major risk factors

BMI	Alcohol (n - 87)				Smoking (n - 87)				Chewing (n - 150)			
	Alcoholics		Non-alcoholics		Smokers		Non-smokers		Chewers		Non-chewers	
	N	%	N	%	N	%	N	%	N	%	N	%
< 16.0												
(CED grade III)	18	20.6	11	12.6	26	29.8	2	2.2	39	26	22	14.6
16.0-17.0												
(CED grade II)	12	14.0	10	11.4	17	19.5	2	2.2	15	10	10	6.6
17.0-18.5												
(CED grade I)	6	7.0	7	8.0	13	14.9	3	3.4	18	12	10	6.6
18.5-20.0												
(Low wt. normal)	14	16.0	5	5.7	18	20.6	1	1.1	18	12	11	7.3
20.0-25.0												
(Normal)	-	-	4	4.5	5	5.7	-	-	4	2.6	3	2.0
Total	50	57.6	37	42.2	79	90.8	8	9.2	94	62.7	56	37.3
χ^2	4.91NS				1.78 NS				0.29 NS			

NS : Non-significant

β -carotene which was only 6 per cent and 5 per cent in both the stages.

Table 5 reveals a similar picture of lower intake of all nutrients but the intake was little more than the male subjects. For calcium the intake was more than the RDA. Statistical analysis showed that there was a significant difference in 't' value for cell nutrients at 1 per cent level but for calcium there was no significant difference. The per cent adequacy of calcium was 100 per cent and 102 per cent in stage II and stage III patients respectively. The per cent adequacy was only 15 per cent and 13 per cent in stage II and stage III patients respectively. Usha Rani et al., 2001 The same was also true for β -carotene and B-complex vitamins. Several experimental and clinical studies have suggested that vitamin A can profoundly modulate the cancer cell growth which has potent cell regulating activity (Usha Rani et al., 2001). Antioxidation may be the most important effect of carotenoids in cancer prevention. The per cent study attempts to throw light up on intake of various nutrients and risk factors of the oesophageal cancer patients.

Relationship Between BMI and Risk Factors: From the table 6 it is clearly shown that, among alcohol users, smokers and chewers, majority of the patients had BMI less than 16 (CED grade III) i.e., 20.6, 29.8 and 26 per cent respectively when compared to non alcoholics, non-smokers and non-chewers. No one was found to have BMI 20-25 (normal) in alcoholics. But in case of smokers and chewers, 5.7 and 2.6 per cent

of them had normal BMI. Hence, these risk factors will lead to less intake of food and ultimately results in low BMI. Statistically there was no significant difference between the risk factors and BMI.

CONCLUSION

It can be concluded that smoking, tobacco and betel chewing, alcohol consumption and non-vegetarianism are the major risk factors for the occurrence of oesophageal cancer. Because of the lower intake of cereals, pulses, green leafy vegetables and fruits, it reflected in the lower levels of calories, protein, fat, iron and β -carotene indicating a low intake of protective factors against cancer.

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