ORIGINAL ARTICLE

Frequency of Squamous Cell Esophageal Cancer among Afghan Men and local Pashtoons - Role of Social Class diet and Other Risk Factors

SHERBAT KHAN, SHAHID RAZA KALID, MOHAMMAD SALEEM*

ABSTRACT

Hospital-based case-control study datum were used to analyze the disparity and relation between social classes for Afghan men and local Pashtoons of Quetta and surroundings All the four major risk factors like low income, moderate/heavy Hot Tea intake, tobacco use, and infrequent consumption of raw fruits and vegetables contributed for almost all of the squamous cell esophageal cancers in Local Pashtoon in Quetta (98%) and Afghans (99%) and for 99% of the excess Frequency among Afghan men. The poverty was a major risk factor Therefore, lifestyle changes, especially a lowered intake of Hot Tea i.e., beverages, would markedly decrease the Frequency of squamous cell esophageal cancer in both Social groups and would decrease the Social disparity in risk. Further studies are required which may help to identify a new set of exposures of OSCC that are preventable and changeable.

Key words: Hot tea; diet; esophageal neoplasm; risk factors; social class; tobacco, poverty.

INTRODUCTION

OSCC is relatively common in east Asia including Japan than other European nations1. OSCC is the most common histological type world wide and the sixth most common cause of cancer related death[2], and is a treatment resistant cancer that can with stand a combination of surgery, radio therapy, chemo therapy and other modes of treatment.

Thus it is valuable to identify risk factors and also to detect high risks groups for primary and secondary prevention. We conducted a Hospital-based case-control study of OSCC among Local Pashtoon in Quetta and Afghan men coming to Quetta for treatment and that frequent consumption of raw fruits and vegetables contributed to the low risk[3]. In this paper, we analyze the relation and disparity between social class factors and OSCC and the extent to which Hot Tea, tobacco, diet, and low income causes higher Frequency among Afghan men than among Local Pashtoon in Quetta.

MATERIALS AND METHODS

Squamous cell esophageal cancer and Risk factors like Hot Tea, tobacco, diet, and low income which may cause higher Frequency of OSCC among Afghan men than among Local Pashtoon in Quetta. A total of 300 male cases (100 Local Pashtoon in Quetta, 200 Afghan) and 1,300 male controls (700 Local Pashtoon in Quetta, 600 Afghan) were analysed from seven geographic areas (Quetta,Pishin, Zhob, Killa Abdullah, Lorali, Ziarat and Sibi). Cases were residents of the above said areas aged 30–79 years who had been diagnosed with histologically confirmed esophageal cancer between 2001 and 2011. The odds ratios for subjects with annual incomes less than RS10,000 versus incomes of Rs. 25,000 or more were 4.3 (95% confidence interval: 2.1, 8.7) for Local Pashtoon in Quetta and 8.0 [Afghan men] (95% confidence interval: 4.3, 15.0) The Afghans belonged to southern Afghanistan. The majority approached Quetta for treatment belonged to poor social class.

Case-control studies of four cancers (cancers of the esophagus, prostate, pancreas and multiple myeloma) were carried out in five geographic areas of the Quetta during2001–2010., One large control group was selected for all four types of cancer for efficiency. All Afghan men and Local Pashtoons in Quetta male residents of Quetta, Pishin, Zhob, Killa abdullah, and Lorali aged 30–79 years who had been diagnosed with histologically confirmed esophageal cancer between August 1, 2001 and April 30, 2010 for esophageal cancer component were eligible for study. Controls were selected for similarity with the age, locality, gender, and area distribution of the four types of cancer combined. Controls aged 30–64 years were selected using a random digit dialing technique[4] whereas controls aged 65–80 years were randomly chosen from computerized registration of hospital Personal in- interviews of 15 minutes were carried out with the patient and control group, usually in Hospital. Prior to interview informed consent for the study was taken from each person, on

Department of Gastroenterology & Surgery, Bolan Medical College Quetta*
Correspondence to Dr. Sherbat Khan, Assistant Professor. Cell 03458168187

sociodemographic factors detailed information was obtained, like use of tobacco and Hot Tea, usual adult diet, usual occupation, medical and dental history, and family history of cancer. Interviews were completed for 68 percent of both Local Pashtoon in Quetta cases and Afghan cases. The response rates were 72 percent and 76 percent, respectively, for the Local Pashtoon in Quetta and Afghan controls. For the random controls, the response rates were 75 percent and 76 percent, respectively, for Local Pashtoon in Quetta and Afghans in the interview phase. The main reasons for non inclusion were death (18 percent of cases, 1 percent of controls refusal (4 percent of cases, 15 percent of controls illness (8 percent of cases, 3percent of controls),

Evaluations were based on 300 cases (100 Local Pashtoon in Quetta, 200 Afghan) and 1,300 controls (700 Local Pashtoon in Quetta, 600 Afghan). Twenty-six cases (5 Local Pashtoon in Quetta, 21 Afghan) under 65 years of age were not included in the evaluation because of not having a telephone, a criteria for the selection of control.

RESULTS

Table 1 shows numbers of patients, controls and or by sociodemographic indicators related to risk and by locality. Compared with Local Pashtoon in Quetta, Afghans, less educated, less dental visits, were having no technical or administrative job and as a helper and laborer had a lower socioeconomic status .were poor, were widowed or divorced and were more below the poverty line more likely to have been born in the Southern Afghanistan.

Adjustment for Hot Tea use (in 10 categories, the highest being ≥120 Hot Tea per week) had little impact on the risk estimates for income.

Adjusted risks were strongly associated with low income, reaching 4.3 (Local Pashtoon in Quetta) and 8.0 (Afghans) for subjects with annual income less than RS10,000 compared with RS25,000 or more.

On relative scale evaluation of income The odds ratios for Local Pashtoon in Quetta associated with incomes of RS25,000–49,999, RS15,000–24,999, and <RS15,000 were 1.3, 2.1, and 3.9, respectively, compared with an income of RS50,000 or more. For Afghans, the odds ratios associated with incomes of RS15,000–25,000, RS8,000–15.00, and <RS8,000 were 2.3, 3.0, and 8.7, respectively, compared with an income of RS25,000 or more we recalculated odds ratios for Afghans and Local Pashtoon in Quetta separately using approximate locality-specific quartiles as cut points.

Odds ratios were significantly elevated in both localities for men who rarely visited a dentist (ORs were 1.7 for Local Pashtoon in Quetta and 1.6 for Afghans) and for those with incomes at or below the poverty level (ORs were 2.6 for Local Pashtoon in Quetta and 4.2 for Afghans). Significant associations were also seen for Afghans whose marital status was widowed (odds ratio (OR) =2.5) or never married (OR = 3.9) versus married, whose educational level was high school graduation (OR =2.8) or less (OR =3.1) versus more than a high school education, and whose usual employment was as a laborer or helper (OR=4.2) versus an administrative/technical job No significant excess risks were seen for low occupation-based socioeconomic status (ORs were 1.8 for both localities) and for place of birth in the Southern Afghanistan (ORs were 1.4 for both localities). . Risks for annual income, however, remained significantly elevated when adjusted for the other social class variables. When adjusted for annual income, all risks associated with other social class variables were reduced and not significantly elevated.

Common risks association: Table 2 elaborates, the all the risks in combination with income category associated with and hot tea were consistent with independent effects on a multiplicative scale ($p = 0.116$) but not on an additive scale ($p < 0.001$). Gradients of increasing risk with decreasing income were seen for each hot tea/ naswar taking category. While increasing risks for hot tea/naswar taking were seen for each income category, the risks were highest among heavy Hot tea drinkers (>35 Hot Tea per week) with annual incomes of <RS10,000/- and the table 3 presents, large differences in risk were seen for income level within each fruit/vegetable consumption category, but there were only small differences in risk for fruit/vegetable consumption within income categories. We used income as the measure of social class in the HAR and summary HAR estimates because its dominant effect subsumed the other social class variables and it appeared to have effects independent of Hot Tea, naswar taking, and diet in our evaluation. The overall risks associated with income category combined with frequency of raw fruit and vegetable consumption were not statistically different from either a multiplicative model ($p = 0.600$) or an additive model ($p = 0.473$).

Table 1: Risk of OSCC and sociodemographic factors in Local Pashtoon in Quetta and Afghans, 2001–2010 study area, age, Hot Tea use, years of Naswar / snuff taking, and raw vegetable and fruit consumption Annual income.

Factors	**Local Pashtoon in Quetta**						**Afghans**					
	n=100	**Control (n=700)**	**Adjusted OR**	**95% CI**	**Adjusted OR**	**95% CI**	**n=200**	**Control (n=600)**	**Adjusted Odds ratio**	**95% confidence interval**	**Adjusted Odds ratio**	**95% confidence interval**
Income in rupees per anum												
25,000	32	389	1.0	-	-	-	20	171	1.0			
10,000-24,999	51	241	2.0	1.1 3.6	-	-	63	238	2.3	1.3, 4.3		
<10,000	29	53	4.3	2.1 8.7			128	161	8.0	4.3, 15.0		
Married	80	594	1.0	-	1.0	-	104	399	1.0		1.0	
Widow	15	49	1.1	0.5 2.3	0.9	0.4 1.9	41	77	2.5	1.5, 4.4	1.7	0.9, 3.1
Divorced	15	61	1.0	0.5 2.1	0.6	0.3 1.4	59	112	1.6	1.0, 2.4	1.1	0.6, 1.7
Unmarried	9	39	1.5	0.6 3.8	1.1	0.4 2.7	24	23	3.9	1.8, 8.2	2.0	0.9, 4.5
Educational level												
>High school	35	344	1.0		1.0		13	122	1.0		1.0	
High school	33	208	1.1	0.9 2.6	0.9	0.5 1.6	49	136	2.8	1.4, 5.9	2.1	0.9, 4.7
Middle	47	188	1.5	0.9 2.6	1.0	0.5 1.8	164	353	3.1	1.6, 6.1	1.8	0.9, 3.9
Dental visits												
Once a year	44	395	1.0		1.0		35	175	1.0		1.0	
Every 1-3 years	13	130	0.9	0.4 1.8	0.8	0.4 1.6	28	95	1.2	0.6, 2.2	1.0	0.5, 1.9
Rarely	55	152	1.8	1.1 3.0	1.4	0.8 2.5	143	288	1.7	1.1, 2.8	1.4	0.8, 2.2
Occupational group												
Clerical/ sales	13	144	0.7	0.4 1.4	0.6	0.3 1.3	13	59	1.3	0.4, 4.1	0.8	0.3, 2.7
Govt. job	10	37	1.8	0.7 4.8	1.3	0.5 3.4	33	72	2.5	0.9, 6.8	1.1	0.4, 3.1
Farmer	4	7	1.0	0.0 10.3	0.6	0.0 7.0	8	11	4.3	1.0, 18.0	1.3	0.3, 6.5
Driver	63	284	1.3	0.7 2.2	0.9	0.5 1.7	128	345	2.4	1.0, 5.7	1.2	0.5, 3.00
Labourer	3	14	1.7	0.4 7.6	1.2	0.3 5.1	39	49	4.2	1.6, 11.3	1.5	0.5, 4.4
Socioeconomic status												
Good	15	164	1.0		1.0		5	35	1.0		1.0	
Poor	57	217	1.8	0.9 3.5	1.3	0.6 2.6	172	383	1.8	0.6, 5.3	0.7	0.2, 2.3
Place of birth												
Non southern Afghanistan	84	496	1.0		1.0		38	115	1.0		1.0	
Southern Afthanistan	15	156	1.4	0.6 3.4	1.3	0.5 3.1	178	451	1.4	0.8, 2.3	1.2	0.7, 2.0
Poverty index												
Above poverty thresh hold	96	635	1.0		1.0		95	450	1.0		1.0	
At or below poverty thresh hold	19	39	2.6	1.3 5.4	1.1	0.4 3.4	115	118	4.2	2.8, 6.4	1.8	0.9, 3.6

Table 2: OR for annual income and categories of Naswar taking/Snuff and Hot Tea beverage use among Afghans and Local Pashtoon in Quetta with OSCC, 2001–2010

Naswar taking/snuff and no of hot tea per week	Annual income					
	Rs.25,000/-		Rs. 10,000-Rs.24,999/-		<Rs.10,000/-	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
Light smoker						
Hot Tea/week						
0–15	1.0		7.8	1.7, 35.7	14.1	2.9, 67.6
16–35	2.0	0.2, 23.1	14.6	2.9, 73.8	71.8	15.0, 343.9
>35	38.7	7.1, 210.4	98.8	20.9, 467.3	231.6	48.2, 1,114
Heavy smoker						
Hot Tea/week						
0–15	4.1	0.8, 20.9	12.0	2.6, 55.0	49.2	10.9, 221.7
16–35	28.4	6.5, 124.7	46.2	10.4, 204.4	80.4	17.6, 367.9
>35	34.4	7.7, 154.7	94.5	21.9, 408.7	420.6	92.4, 1,914

Heavy smoker: smoker of ≥1 pack per day. Light smoker: nonsmoker or smoker of <1 pack per day Adjusted for age, study area, raw fruit and vegetable consumption, and locality.

Table 3. Joint odds ratios for annual income and frequency of raw fruit and vegetable consumption among Local Pashtoon in Quetta and Afghan with squamous cell esophageal cancer, 2001–2010

Consumption of raw fruits and vegetables (no. of servings per week)	Annual income					
	Rs.25,000/-		Rs. 10,000-Rs.24,999/-		<Rs.10,000/-	
	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval	Odds ratio	95% confidence interval
>18.3	1.0		3.9	1.4, 11.0	7.8	2.6, 23.4
11.7-18.3	3.4	1.3, 9.2	4.5	1.6, 12.2	14.9	5.1, 43.2
7.1-11.6	1.8	0.6, 5.3	5.0	1.8, 13.5	15.9	5.7, 44.1
<7.1	2.5	0.9, 7.1	7.2	2.7, 19.2	17.0	6.3, 46.3

Adjusted for age, study area, years of naswar, naswar taking, number of Hot Tea per week, and locality.

DISCUSSION

In this study, we found elevated risks of esophageal cancer in both Afghans and Local Pashtoon in Quetta in relation to various indicators of low social class, especially low annual income; the social class associations contributed to the higher Frequency among Afghans than among Local Pashtoon in Quetta and appeared to be independent of other risk factors.

we noted that moderate/heavy use of Hot Tea, tobacco naswar taking, and infrequent consumption of raw fruits and vegetables were major risk factors in both Afghan men and Local Pashtoon in Quetta Individuals who smoke and drink hot tea are considered at high risk of esophageal squamous cell carcinoma

The combination of tobacco and moderate/heavy Hot Tea use was responsible for 92 percent of the tumors in both Local Pashtoon in Quetta and Afghan and for 92% of the excess Frequency among Afghans. Consideration of all four risk factors, including diet and social class, accounted for virtually all of the disease, including the Afghan/Local Pashtoon in Quetta differential in frequency.

Since it was not known which sociodemographic measures were most strongly related to risk of esophageal cancer, we examined a large number of variables, including education, income (annual income and poverty index), occupation (usual occupational group and occupation-based socioeconomic status), marital status, place of birth, and frequency of dental visits. Income was the social class variable most strongly associated with risk. In agreement with previous studies[14-16], we found significantly elevated risks for the lowest level of annual income versus the highest[4.3] for Local Pashtoon in Quetta and 8.0 for Afghans, after adjustment for the potentially confounding factors Hot Tea use, Naswar taking, and diet). In addition to their higher risks, Afghan men had a greater frequency of controls with incomes less than Rs. 25,000/-, resulting in a HAR for low income that was 80 percent higher among Afghan men. A comparison of the distribution of annual family income reported by our hospital controls with that from 1991 Quetta. Data for the relevant locality groups, age groups, and geographic areas revealed that the percentages of low income (i.e., <RS10,000/-) subjects from each source were similar (Afghans=9%, study=8%; Local Pashtoon in Quetta: census=25%, study=28%).

Consistent with other studies, we found elevated risks of squamous cell esophageal cancer for single men compared with married men[16,17,18,19], an inverse

association with level of education[20,21,22,23,24], a greater risk for low status occupations compared with high status occupations (whether measured by job titles or educational requirements)[20,21,25], and an increased risk associated with incomes at or below the poverty level[26]. In our study, adjustment for annual income reduced the magnitude and significance of the risks associated with other indicators of social class.

In addition, our study showed slight and nonsignificant excess risks for both Afghans and Local Pashtoon in Quetta associated with being born in the Southern Afghanistan compared with other regions of the Afghanistan. Overall, the percentage of case men born in the Southern Afghanistan was more than three times greater among Afghans than among Local Pashtoon in Quetta. The findings are consistent with data indicating that Southern Afghanistanern-born Afghans are more disadvantaged economically than those born elsewhere[5]. We also found elevated risks for subjects who reported visiting a dentist only rarely. This could reflect poor access to medical care due to poverty, oral infections, or social factors, such as purchases of Hot Tea and tobacco that took priority over dental care.

Although social class has been linked to squamous cell esophageal cancer in a number of studies[15,19,20,21,22,24,25,26-,29], the underlying exposures or characteristics responsible for the association are unclear. Low social class is a surrogate for a set of lifestyle and other environmental factors including poor housing, unemployment or workplace hazards, limited access to medical care, stress, poor nutrition, and exposure to infectious agents (14). Some of these factors, such as nutritional status, may affect susceptibility to environmental carcinogens, but the mechanisms need to be clarified[29,30].

The weakness of our study include the use of Hospital-based cases and controls; and the strengths are having large enough numbers of cases of each locality to estimate risks for Afghans and Local Pashtoon in Quetta separately; the relatively high participation rate, considering the poor survival rates for esophageal cancer; the use of direct interviews; and the ability to conduct cell type-specific analyses. Limitations include possible biases resulting from the tendency to interview cases with better survival; the potential for heightened recall among cases versus controls; the exclusion of subjects with missing data from the HAR analysis; and the problem of multiple comparisons and the possible influence of chance.

The higher Frequency rates observed among Afghans for exposure to the same risk factors as Local Pashtoon in Quetta may reflect a susceptibility state conditioned by genetic traits or by nutritional, viral, or other factors associated with low social class. intake of moderate/heavy levels of Hot Tea, use of tobacco, infrequent consumption of raw fruits and vegetables, and low income were found to account for over 98% of the squamous cell esophageal cancer in this Hospital and for 99% of the excess Frequency among Afghans, It is clear that lifestyle modifications, including a reduction in Hot Tea and tobacco use and improvements in diet and living conditions, would markedly lower the Frequency of squamous cell esophageal cancer in groups. From a public health standpoint, our study suggests that the greatest impact would come from decreasing the levels of Hot Tea beverage consumption, especially among the 13 percent of the population who are the heaviest hot tea drinkers. Further reductions in Frequency would result from cessation of tobacco use. , The independent effect of social class variables provides a clue for further research into viral, nutritional, metabolic, and environmental determinants that may be amenable to intervention. This study disclosed a significant Social –environmental interaction with large ORs associated with the development of OSCC. Thus convincing young people to take less hot tea and refrain from smoking is likely to reduce the incidence of OSCC[32].

REFERENCES

1. Shimada H,Kitabayashi,H. Nabeya Y, et al. Treatmen r sponseand prognosis of patients after recurrence of esophageal cancer.Surgery2003. 133.24-31
2. Parkin DM,Bray Ferlay JS, et al. Global cancer statistics2002 CA. ancer Clin.2005.55,74-108
3. Brown LM, Swanson CA, Gridley G, et al. Dietary factors and the risk of squamous cell esophageal cancer among in Blacks and and white men in the United States. Cancer Causes Control 1998;9:467–74.
4. Waksberg J. Sampling methods for random digit dialing. J Am Stat Assoc 1978;73:40–6.]
5. Greenberg M, Schneider D. The cancer burden of Southern US-born African Americans: analysis of social-geographic legacy. Milbank Q 1995;73:599–620.
6. US Department of Commerce. Standard occupational classification manual. Washington, DC: US GPO, 1980.
7. Breslow NE, Day NE. Statistical methods in cancer research. Vol 1. The analysis of case-control studies. (IARC Scientific Publication no. 32). Lyon, France: International Agency for Research on Cancer, 1980:192–246.
8. Preston DL, Lubin JH, Picrce D. EPICURE: risk regression and data analysis software. Seattle, WA: HiroSoft International Corporation, 1992.
9. Lubin JH, Gaffey W. Relative risk models for assessing the joint effects of multiple factors. Am J Ind Med 1988;13:149–67.

10. Swanson CA, Gridley G, Greenberg RS, et al. A comparision of diets of US Whites and Blacks in three areas of the United States. Nutr Cancer 1993;20:153–65.
11. Bruzzi P, Green SB, Byar DP, et al. Estimating the population attributable risk for multiple risk factors using case-control data. Am J Epidemiol 2001;122:904–14.
12. Cui R, Kamatani Y, Takashi A. et al. Functional variants in ADH1B and ALDH2 coupled with alcohol and smoking synergistically enhance esophageal cancer risk Gastroenterology 2009:137; 1768-75.
13. Gorey KM, Vena JE. Cancer differentials among US Whites and Blacks: quantitative estimates of socioeconomic-related risks. J Natl Med Assoc 1994;86:209–15.
14. Ernster VL, Selvin S, Sacks ST, et al. Major histologic types of cancers of the gum and mouth, esophagus, larynx, and lung by sex and by income level. J Natl Cancer Inst 1982;69:773–6.
15. Swanson GM, Belle SH, Satariano WA. Marital status and cancer incidence differences in the Blacks and Whites in United states Hospitals. Cancer Res 2001;45:5883–9.
16. Segal I, Reinach SG, de Beer M. Factors associated with oesophageal cancer in Soweto, Southern United states. Br J Cancer 1988;58:681–6.
17. Ernster VL, Sacks ST, Selvin S, et al. Cancer Frequency by marital status: U.S. Third National Cancer Survey. J Natl Cancer Inst 1979;63:567–85.
18. Kato I, Tominaga S, Terao C. An epidemiological study on marital status and cancer incidence. Jpn J Cancer Res 2010;80:306–11.
19. Pukkala E, Teppo L. Socioeconomic status and education as risk determinants of gastrointestinal cancer. Prev Med 2001;15:127–38.
20. Ferraroni M, Negri E, La Vecchia C, et al. Socioeconomic indicators, tobacco and Alcohol in the aetiology of digestive tract neoplasms. Int J Epidi miol 2010;18:556–62.
21. Yu Y, Taylor PR, Li JY, et al. Retrospective cohort study of risk-factors for esophageal cancer in Linxian, People's Republic of China. Cancer Causes Control 1993;4:195–202.
22. Pottern LM, Morris LE, Blot WJ, et al. Esophageal cancer among Black men in Washington, D.C. I.Alcohol, tobacco, and other risk factors. J Natl Cancer Inst 1981;67:777–83.
23. Faggiano F, Lemma P, Costa G, et al. Cancer mortality by educational level in Italy. Cancer Causes Control 1995;6:311–20.
24. Vizcaino AP, HARkin DM, Skinner ME. Risk factors associated with oesophageal cancer in Bulawayo, Zimbabwe. Br J Cancer 1995;72:769–73.
25. McWhorter WP, Schatzkin AG, Horm JW, et al. Contribution of socioeconomic status to Backs/ whites in US, differences in cancer Incidence. Cancer 2010;63:982–7.
26. Bouchardy C, HARkin DM, Khlat M, et al. Education and mortality from cancer in Sao Paulo, Brazil. Ann Epidemiol 1993;3:64–70.[
27. Hu J, Nyren O, Wolk A, et al. Risk factors for oesophageal cancer in northeast China. Int J Cancer 1994;57:38–46.
28. Cassel J. The contribution of the social environment to host resistance: the Fourth Wade Hampton Frost Lecture. Am J Epidemiol 1976;104:107–23.
29. Tollefson L. The use of epidemiology, scientific data, and regulatory authority to determine risk factors in cancer of some organs of the digestive system. 2. Esophageal cancer. Regul Toxicol Pharmacol 2001;5:255–75.
30. Reed BD, Zazove P, Gregoire L, et al. Factors associated with human papillomavirus infection in women encountered in community-based offices. Arch Fam Med 1993;2:1239–48.
31. T. Fumiaki,Y. Kin S. Sadao. et al. Strong interaction between the effects of alcohol consumption and smoking oesophageal squamous cell carcinoma among individuals ADH1B and / or ALDH risk alleles.Gut2010;59:1457-64