

RESEARCH ARTICLE

Esophageal Cancer and associated Factors among Uzbek-Turkmen and Other Ethnic Groups in the Northern Part of Afghanistan

Mohammad Hassan Hamrah¹, Mohammad Shoaib Hamrah², Mitsuro Kanda³
Junichi Sakamoto⁴, Mohammad Hussain Hamrah¹, Asif Hami⁵, Ahmad Edris
Hamrah¹, Ahmad Elias Dahi¹, Mohammad Hashem Hamrah^{1*}

Abstract

Background: A high incidence rate of esophageal cancer has been observed in the Northern part of Afghanistan, particularly among those of Uzbek-Turkmen ethnicity. However, there is a paucity of published data from which to compare the prevalence of environmental risk factors for esophageal cancer between Uzbek-Turkmen and other ethnic groups. Thus, we investigated the prevalence of environmental risk factors associated with esophageal cancer in the Northern part of Afghanistan, focusing on ethnicity differences. **Methods:** This retrospective study covered 168 patients diagnosed with esophageal cancer based on endoscopic findings when attending an outpatient clinic from October 2013 to April 2016. Demographic data and burden of relevant environmental risk factors were compared between Uzbek-Turkmen and other ethnic groups. Results: In the total of 168 patients (108 Uzbek-Turkmen and 60 other ethnicities), males had significantly higher rates of opium use, chewing nass (a mixture of tobacco, ash and lime), and smoking than female patients. The mean age of the Uzbek-Turkmen group was 62.9 years, while that of the other ethnic group cases was 59.1. The prevalence of opium use, chewing nass and hot tea consumption was significantly higher in the Uzbek-Turkmen group. **Conclusions:** This study showed that there were significant differences in prevalence of opium, nass, and hot tea consumption between Uzbek-Turkmen and the other ethnic group patients with esophageal cancer in the northern part of Afghanistan.

Keywords: Esophageal cancer- risks factors- ethnic- Afghanistan

Asian Pac J Cancer Prev, 18 (2), 333-337

Introduction

Esophageal cancer is the 8th most common cancer in the world, and ranks as the 6th the leading cause of death from cancer (Pennathur et al., 2013; Siegel et al., 2015). More than 80% of esophageal cancer was diagnosed in developing countries in 2008 (Amani et al., 2013), and the incidence rate of this disease varies by more than 20-fold depending on regions of the world (Asombang et al., 2016). The differences in geographical distribution of esophageal cancer are linked to various exogenous and endogenous factors such as ethnic groups within the population (Cook et al., 2009; Igissinov et al., 2013). High-risk geographical areas extend from northern Iran through Turkmenistan, Northern Afghanistan, Uzbekistan, and Kazakhstan to Northern China, thus this area is called the Asian esophageal cancer belt (Asombang et al, 2016; Mansour-Ghanaei et al., 2012).

Although the major risk factors associated with esophageal cancer in the Asian cancer belt have been poorly

understood (Igissinov et al, 2013), poor nutritional statuses, low intake of fruits and vegetables, low socioeconomic status smoking and excessive alcohol consumption are known as putative risk factors (Asombang et al, 2016; Pennathur et al, 2013). Furthermore, other possible risk factors of esophageal cancer in the high-incidence areas have been reported to include excessive consumption of hot tea, opium, and nass chewing (Asombang et al, 2016; Marjani et al., 2010; Moore et al., 2010).

In Afghanistan, our previous study indicated that the Uzbek-Turkmen ethnic group had a high incidence of esophageal cancer in the northern part of Afghanistan (Hamrah et al., 2014). However, little data on ethnic differences in the prevalence of environmental risk factors for esophageal cancer is available currently. Therefore, we conducted a retrospective study with the aim of determining the prevalence of environmental risk factors, focusing on the differences between the Uzbek-Turkmen and other ethnic groups, in the northern part of Afghanistan.

¹Curative Clinic, Andkhoy, ²Jahan Saht Endoscopic clinic in Shegerghan City, Jozjan province, Afghanistan, ³Department of Cardiology, ⁴Department of Gastroenterological Surgery (Surgery II), Nagoya University Graduate School of Medicine, Nagoya, ⁵Tokai Central Hospital, Kakamigahara, Japan. *For Correspondence: hashem.sahab@gmail.com

Materials and Methods

Patients and factors evaluated

This study was approved by the Institutional Review Board of the Jozjan Provincial Hospital. The medical records of 168 patients with esophageal cancer diagnosed by an esophagogastroduodenoscopy examination at an outpatient clinic in Shegerghan City, the capital of Jozjan province in the north part of Afghanistan from December 2013 to May 2016 were retrospectively analyzed. Patients were diagnosed as esophageal cancer based on endoscopic findings as described previously (Hamrah et al, 2014). The main ethnic groups living in the province are Uzbek-Turkmen followed by Tajik, Pashtun and Arabs. Patient demographics included age, sex, education, ethnicity, occupation, and place of residence.

Smoking cigarettes, chewing nass, opium use and hot tea consumption were also examined as an environmental factors. As for smoking, patients were categorized as follows: i) current smoker, patients who had smoked 100 cigarettes in their lifetime and who currently smoke cigarettes; ii) past smokers, patients who had smoked at least 100 cigarettes in their lifetime but had stopped smoking at the time of the interview; iii) non-smoker, patients who have never smoked, or who had smoked < 100 cigarettes in their lifetime. Patients were nass users were also categorized as follows: i) current nass user, those who had used nass respectively at least weekly for a period of 6 months or more; ii) past users, patients who had stopped using nass at least one year before the interview; iii) non user, patients who have never consumed nass. There are three types of opium which includes teriak

Table 1. Comparison of Demographic Characteristics of Patients with Esophageal Cancer between the Uzbek-Turkmen and Other Ethnic Groups

	Total (n=168)	Male (n=93)	Female (n=75)	P
Age (years), mean ± SD	61.5 ± 9.8	62.9 ± 9.4	58.1 ± 9.9	0.634
Marital Status				0.184
Single	6 (3.6)	4 (4.3)	2 (2.7)	
Married	143 (85.1)	75 (80.6)	68 (90.7)	
Others	19 (11.3)	14 (15.0)	5 (6.7)	
Level of education				0.007
Illiterate	101 (60.1)	45 (48.4)	56 (74.7)	
Primary/private education	17 (10.1)	13 (14.0)	4 (5.3)	
Secondary	31 (18.4)	22 (23.6)	9 (12.0)	
High school or more	19 (11.3)	13 (14.0)	6 (8.0)	
Ethnicity				0.298
Uzbek-Turkmen	108 (64.3)	63 (67.8)	45 (60.0)	
Other ethnic group	60 (35.7)	30 (32.3)	30 (40.0)	
Occupation				<0.001
Employed	54 (32.1)	42 (45.2)	12 (16.0)	
Unemployed	78 (46.4)	29 (31.2)	49 (65.3)	
Others	36 (21.4)	22 (23.6)	14 (18.7)	
Place of residence				0.038
Urban	66 (39.3)	30 (32.2)	36 (48.0)	
Rural	102 (60.7)	63 (67.7)	39 (52.0)	
Opium use				<0.001
Non-users	117 (69.6)	46 (49.5)	71 (94.7)	
Users	51 (30.4)	47 (50.5)	4 (5.3)	
Nass use				0.037
Current users	66 (39.3)	40 (43.0)	26 (34.7)	
Past users	25 (14.9)	18 (19.4)	7 (9.3)	
Non-users	77 (45.8)	35 (37.6)	42 (56.0)	
Smoking cigarettes				0.001
Current smokers	28 (16.7)	22 (23.7)	5 (6.7)	
Past smokers	9 (5.3)	8 (8.6)	1 (1.3)	
Non-smokers	131 (78.0)	63 (67.7)	69 (92.0)	
Drinking tea temperature				0.721
Cold/lukewarm	130 (77.4)	71 (76.3)	59 (78.7)	
Hot	38 (22.6)	22 (23.7)	16 (21.3)	

SD, standard deviation

Table 2. Frequency of Risk Factors for Esophageal Cancer among the Uzbek-Turkmen and Other Ethnic Groups

	Uzbek-Turkmen (n=108)	Other ethnic group (n=60)	P
Age, mean, years	62.9 ± 9.5	59.1 ± 9.9	0.675
Male	63 (58.3)	30 (50.0)	0.298
Marital Status			0.266
Single	2 (1.9)	4 (6.7)	
Married	94 (87.0)	49 (81.7)	
Others	12 (11.1)	7 (11.7)	
Level of education			0.827
Illiterate	63 (58.3)	40 (66.7)	
Primary/private education	11 (10.2)	4 (6.7)	
Secondary	20 (18.5)	11 (18.3)	
High school or more	14 (13.0)	5 (8.3)	
Occupation			0.078
Employed	36 (33.3)	18 (30.0)	
Unemployed	44 (40.7)	34 (56.7)	
Others	28 (25.9)	8 (13.3)	
Place of residence			0.851
Urban	43 (39.8)	23 (38.3)	
Rural	65 (60.2)	37 (61.7)	
Smoking status			0.212
Current smoker	22 (20.4)	6 (10.0)	
Past smoker	6 (5.5)	3 (5.0)	
Non smoker	80 (74.1)	51 (85.0)	
Opium use			0.012
Never use	68 (63.0)	49 (81.7)	
Reported use	40 (37.0)	11 (18.3)	
Nass use			0.023
Current users	49 (45.4)	17 (28.3)	
Past users	18 (16.7)	7 (11.7)	
Non-users	41 (37.9)	36 (60.0)	
Drinking tea temperature			0.011
Cold/lukewarm	77 (71.3)	53 (88.3)	
Hot	31 (28.7)	7 (11.7)	

SD, standard deviation

(crude opium), shireh (a refined opium extract), and sukhteh (opium dross left in pipes after smoking opium) (Nasrollahzadeh et al., 2008). Opium users were defined as individuals who had used any type of opium at least once per week within six months before the interview.

Statistical analysis

The mean values of variables were presented with standard deviation. Categorical variables were displayed by actual counts and percentages. Continuous data were compared using the t-test. Categorical data were compared using χ^2 test. A P value of < 0.05 was considered as statistically significant. All analyses were performed with the SPSS 20.0 software package (SPSS, Chicago, IL, USA).

Results

Sociodemographic characteristics

The sociodemographic characteristics of all 168 patients are summarized in Table 1. The mean age of the patients was 61.5 years, and the male-to-female ratio was found to be 93:75. Of them, 101 (60.1%) were illiterate. The employment rate was 32.1%, and considerably higher in male than in female ($P<0.001$). Male patients has a significantly larger proportion of opium users compared to female patients (50.5% and 5.3 %, respectively; $P<0.001$). In terms of nass use and smoking, male patients had a significantly higher prevalence of users than female patients ($P=0.037$ and $P=0.001$, respectively).

Comparison of environmental factors between the Uzbek-Turkmen and other ethnic groups

Results of the comparison between the Uzbek-Turkmen

and other ethnic groups were shown in Table 2. The mean age of patients in the Uzbek-Turkmen and other ethnic groups were 62.9 years and 59.1 years, respectively. The male-to-female ratio in the Uzbek-Turkmen was 63:45, while it was 30:30 in the other ethnic group. Opium use was more common in the Uzbek-Turkmen patients compared with other ethnic groups (37.0% and 18.3%, respectively; $P=0.012$). The Uzbek-Turkmen patients had a significantly larger proportion of nass user than the other ethnic groups (45.4% and 28.3%, respectively; $P=0.023$). There was also a considerable difference with regard to hot tea consumption between the Uzbek-Turkmen and other ethnic groups (28.7% and 11.7%, respectively; $P=0.011$).

Discussion

To our knowledge, this is the first study to compare environmental risk factors associated with esophageal cancer between the Uzbek-Turkmen and other ethnic groups in the northern part of Afghanistan. There is broad variation of life style and personal habits among different communities and ethnicities. It has been reported that environmental carcinogens impact on the genetic and epigenetic alterations through irreversible modifications which result in cancer development (Domper Arnal et al., 2015; Huang and Yu, 2016; Tang et al., 2001). Subsequently, vulnerabilities in each population can be generated from genetic and epigenetic alterations induced by both endogenous and exogenous carcinogenic factors (Huang and Yu, 2016; Pennathur et al, 2013). Interactions between environmental and genetic factors have been suggested as an individual who is genetically susceptible would be at higher risk than a less-susceptible individual when exposed to moderate intensities of environmental risk factors (Domper Arnal et al, 2015; Huang and Yu, 2016; Marjani et al, 2010).

First, we evaluated sociodemographic characteristics of patients with esophageal cancer with consideration on sex differences. The rates of employment rate, opium use, nass use and smoking were significantly higher in male patients compared to female patients. These findings provided a knowledge on the trend of patients with esophageal cancer in the northern part of Afghanistan.

The most important finding of the current study was the ethnic differences of environmental factors in this area. Our data demonstrated that opium consumption was significantly more common in the Uzbek-Turkmen group compared with the other ethnic group. The northern part of Afghanistan is a suitable place to evaluate the association between opium consumption and esophageal cancer among different ethnic groups, because esophageal cancer is endemic in this region and a large percentage of the world's opium is produced in Afghanistan (Hamrah et al, 2014; Todd et al., 2012). There have been several reports indicating that opium use is a potential risk factor of esophageal cancer in the northeastern Iran, where is known as a high-incidence area of esophageal cancer (Hewer et al., 1978; Kamangar et al., 2009). Moreover, a high urinary excretion of morphine metabolite was observed among patients with esophageal cancer in this area (Ghadirian et al., 1985). The high prevalence of

opium use among Uzbek-Turkmen patients might be due to the social reasons that opium is still commonly used for a traditional treatment of pain, diarrhea, and insomnia, as observed in in the northeastern Iran (Nasrollahzadeh et al, 2008). There was a significant difference in the prevalence of nass chewing between Uzbek-Turkmen and other ethnic groups. Chewing nass has also been considered as a potential risk factor of esophageal cancer (Asombang et al, 2016; Kmet and Mahboubi, 1972; Mahboubi et al., 1973). Nass use was reported to be common among Turkmen in Iran, who have a high incidence of esophageal cancer (Marjani et al, 2010). Moreover, we found that there is a significant difference in the consumption of hot tea between the Uzbek-Turkmen and other ethnic groups. Particularly, Uzbek-Turkmens in the northern part of Afghanistan are keen on consuming high temperature tea. It has been reported that individuals drinking hot tea are at risk of esophageal cancer in several studies from different regions around the world (De Jong et al., 1974; Ganesh et al., 2009; Ghadirian, 1987; Saidi et al., 2000). An earlier study from China indicated that the consumption of hot tea, and thermal irritation may facilitate carcinogen through the esophagus lining (Ghadirian, 1987).

This study has some limitations. The data was retrospectively collected from the medical records of relatively small number of patients in a single center. Furthermore, the diagnosis of esophageal cancer was based on endoscopy finding because the histopathological examination was inaccessible in this region. Finally, there was the lack of access to the long-term clinical courses of the patients. Nevertheless, our data would be beneficial to accumulate additional data regarding this issue because it was the first report on the prevalence of risk factor for esophageal cancer among different ethnicities in Afghanistan.

In summary, our results demonstrated that there were significant differences in the prevalence of environmental risk factors associated with esophageal cancer including opium, nass and hot tea consumption between Uzbek-Turkmen and other ethnic groups. Further studies are mandated to investigate possible environmental and genetic risk factors and the interaction with each other in the northern part of Afghanistan.

Acknowledgements

This project was supported in part, by the non-profit organization Epidemiological and Clinical Research Information Network (ECRIN).

Conflicts of interest

The authors declare that they have no conflict of interest in this manuscript.

References

- Amani F, Ahari SS, Akhghari L (2013). Epidemiology of esophageal cancer in ardebil province during 2003-2011. *Asian Pac J Cancer Prev*, **14**, 4177-80.
- Asombang AW, Kayamba V, Lisulo MM, et al (2016). Esophageal squamous cell cancer in a highly endemic

- region. *World J Gastroenterol*, **22**, 2811-7.
- Cook MB, Chow WH, Devesa SS (2009). Oesophageal cancer incidence in the United States by race, sex, and histologic type, 1977-2005. *Br J Cancer*, **101**, 855-9.
- De Jong UW, Breslow N, Hong JG, et al (1974). Aetiological factors in oesophageal cancer in Singapore Chinese. *Int J Cancer*, **13**, 291-303.
- Domper Arnal MJ, Ferrandez Arenas A, Lanas Arbeloa A (2015). Esophageal cancer: Risk factors, screening and endoscopic treatment in Western and Eastern countries. *World J Gastroenterol*, **21**, 7933-43.
- Ganesh B, Talole SD, Dikshit R (2009). Tobacco, alcohol and tea drinking as risk factors for esophageal cancer: A case-control study from Mumbai, India. *Cancer Epidemiol*, **33**, 431-4.
- Ghadirian P (1987). Thermal irritation and esophageal cancer in northern Iran. *Cancer*, **60**, 1909-14.
- Ghadirian P, Stein GF, Gorodetzky C, et al (1985). Oesophageal cancer studies in the Caspian littoral of Iran: some residual results, including opium use as a risk factor. *Int J Cancer*, **35**, 593-7.
- Hamrah MS, Hamrah MH, Rabi M, et al (2014). Prevalence of esophageal cancer in the Northern part of Afghanistan. *Asian Pac J Cancer Prev*, **15**, 10981-4.
- Hewer T, Rose E, Ghadirian P, et al (1978). Ingested mutagens from opium and tobacco pyrolysis products and cancer of the oesophagus. *Lancet*, **2**, 494-6.
- Huang FL, Yu SJ (2016). Esophageal cancer: Risk factors, genetic association, and treatment. *Asian J Surg*, **16**, 27986415.
- Igissinov S, Igissinov N, Moore MA, et al (2013). Component analysis of esophageal cancer incidence in Kazakhstan. *Asian Pac J Cancer Prev*, **14**, 1945-9.
- Kamangar F, Chow WH, Abnet CC, et al (2009). Environmental causes of esophageal cancer. *Gastroenterol Clin North Am*, **38**, 27-57.
- Kmet J, Mahboubi E (1972). Esophageal cancer in the Caspian littoral of Iran: initial studies. *Science*, **175**, 846-53.
- Mahboubi E, Kmet J, Cook PJ, et al (1973). Oesophageal cancer studies in the Caspian littoral of Iran: the Caspian cancer registry. *Br J Cancer*, **28**, 197-214.
- Mansour-Ghanaei F, Heidarzadeh A, Naghipour MR, et al (2012). A 10-year study of esophageal cancer in Guilan province, Iran: the Guilan Cancer Registry Study (GCRS). *Asian Pac J Cancer Prev*, **13**, 6277-83.
- Marjani HA, Biramijamal F, Hossein-Nezhad A, et al (2010). Prevalence of esophageal cancer risk factors among Turkmen and non-Turkmen ethnic groups in a high incidence area in Iran. *Arch Iran Med*, **13**, 111-5.
- Moore MA, Eser S, Igissinov N, et al (2010). Cancer epidemiology and control in North-Western and Central Asia - past, present and future. *Asian Pac J Cancer Prev*, **11**, 17-32.
- Nasrollahzadeh D, Kamangar F, Aghcheli K, et al (2008). Opium, tobacco, and alcohol use in relation to oesophageal squamous cell carcinoma in a high-risk area of Iran. *Br J Cancer*, **98**, 1857-63.
- Pennathur A, Gibson MK, Jobe BA, et al (2013). Oesophageal carcinoma. *Lancet*, **381**, 400-12.
- Saidi F, Sepehr A, Fahimi S, et al (2000). Oesophageal cancer among the Turkomans of northeast Iran. *Br J Cancer*, **83**, 1249-54.
- Siegel RL, Miller KD, Jemal A (2015). Cancer statistics, 2015. *CA Cancer J Clin*, **65**, 5-29.
- Tang JC, Lam KY, Law S, et al (2001). Detection of genetic alterations in esophageal squamous cell carcinomas and adjacent normal epithelia by comparative DNA fingerprinting using inter-simple sequence repeat PCR. *Clin Cancer Res*, **7**, 1539-45.
- Todd CS, Macdonald D, Khoshnood K, et al (2012). Opiate use, treatment, and harm reduction in Afghanistan: recent changes and future directions. *Int J Drug Policy*, **23**, 341-5.