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Oral squamous cell carcinoma and cultural oral risk habits in Vietnam

Abstract: *Objectives:* In South-Central Asia, 80% of head and neck cancers are found in the oral cavity and oropharynx. In Vietnam, oral cancer is often not being detected until people experience debilitating circumstances to normal oral function. The aims of the study were to explore the patterns of oral squamous cell carcinoma (OSCC) and its risk indicators, the structure of oral health care in Vietnam and trends in prevalence of cultural risk habits in southern Vietnamese patients. *Materials and Methods:* A retrospective clinical study was performed from 1 July 2005 to 1 April 2006 at Ho Chi Minh City Oncology hospital in Vietnam. Of the 161 cases, 147 subjects were diagnosed with OSCC, including 100 male and 47 female adults aged 24–85 years. Data were collected by a structured interview and clinical examination. *Results:* Over 40% of the women with OSCC reported chewing betel quid and the most prevalent risk habit in males was smoking (91.0%). Daily alcohol use was reported by 79.0% of males and 2.1% of females. Two-thirds of the cases of OSCC were diagnosed at the 2nd and 3rd stage of cancer. The more advanced stages of cancer were observed in males than in females. The prevalence of tobacco and alcohol use in males with OSCC was higher in this study than in the previous Vietnamese studies. *Conclusion:* High frequency of risk habits in both genders was reported in OSCC Vietnamese patients. A trend of increased tobacco and alcohol use was observed in male OSCC patients. A lower prevalence of later staging in Vietnam was observed in this study than in earlier studies.

Key words: alcohol; betel quid; oral cancer; resource-poor countries; risk habits; tobacco

Introduction

Cancer is a serious public health problem. In South-Central Asia, cancer of the oral cavity ranks among the three most common types of cancer (1). In most regions of the world, about 40% of head and neck cancers are known to be squamous cell carcinomas developing in the oral cavity. Similarly, in Asia, 80% of head and neck cancers are usually found in the oral cavity and oropharynx (2, 3). It has been suggested that the cancer epidemic observed in developed countries, and increasingly in developing countries, is attributable to the combined effect of ageing, and high or increasing levels of the prevalence of cancer risk factors such as tobacco, unhealthy diet, physical inactivity and infections (1). Tobacco use and excessive alcohol consumption have been estimated to account for about 90% of cancers in the oral cavity (4). Furthermore, the oral cancer risk increases when tobacco is used in combination with alcohol or betel quid with areca nut (4).

The reported aetiological agents and risk factors for oral cancer include tobacco use, frequent alcohol consumption, the use of areca nut, a compromised immune system, a past history of cancer, dietary habits and less well-established factors such as infection with certain types of human papilloma viruses (5–9). Alarmingly, 25% of newly diagnosed cases of oral cancer do not fit the high-risk profile (10–12). It has been reported that the rapid urbanization leading to an unhealthy lifestyle such as increased access to and the utilization of tobacco in its various forms as well as abuse of alcohol, leads to an increased incidence of oral precancer and cancer (10).

Tobacco use in all its forms is first on the list of risk factors of oral cancer with at least 75% of those diagnosed with oral cancer being tobacco users (13). Worldwide, Vietnam has the highest rate of smoking among males (63.4%) (5). An increasingly high uptake of smoking by youth and women is being reported (10). When tobacco use is combined with frequent alcohol consumption, the risk increases substantially and these risk factors act synergistically i.e. they exacerbate each other's harmful effects (13–15). In December 2006, The Vietnamese Deputy Minister of Health, Le Ngoc Trong, expressed that excessive alcohol consumption had reached alarming proportions with serious consequences for the health and safety of the public (16).

Alcohol's effect on the mouth may be the key to understanding how it works with tobacco to increase the risk of developing cancer. The dehydrating effect of alcohol on cell walls enhances the ability of tobacco carcinogens to permeate mouth tissues. Moreover, nutritional deficiencies associated with heavy drinking can lower the body's natural ability to use antioxidants to consequently prevent the development of cancers (13).

Oral cancers are more common in parts of the world where areca nut in betel quid is chewed. The International Agency for Research on Cancer has classified betel quid with and without tobacco as a human carcinogen (2). The use of areca nut in any form is not safe for oral health and the commercially manufactured forms with additives such as sugar may further increase dental health risks. As oral cancer rates increase throughout the world, studies of the once uniquely Southeast Asian traditional cultural habit of betel nut chewing is now a worldwide phenomenon that is increasing at an alarming rate (17), which is a known risk factor for oral leucoplakia, oral submucous fibrosis and squamous cell carcinoma (17–21). Therefore, public and oral health professional awareness of such cultural risk factors and the resulting oral health effects are a prerequisite to curb the increasing incidence of oral cancer.

A matter of concern to be emphasized is that oral cancer is often not being detected in Vietnam until people experience debilitating circumstances to normal oral function. Consequently, treatment at such an advanced stage can be only palliative and oral cancer is considered among the most debilitating and disfiguring of all cancers (22).

The aims of the present research were: (i) to examine the patterns of oral squamous cell carcinoma (OSCC) and its risk indicators in southern Vietnamese patients in the Benh Vien Buou, Oncology Hospital in Ho Chi Minh City, (ii) to explore the structure of oral health care in Vietnam as it relates to cancer treatment and (iii) to estimate the time trend in oral cancer and related risk habits in Vietnamese OSCC patients.

Material and methods

Study design

This retrospective clinical study was approved by the University of British Columbia's Clinical Ethics Board (#C05-0148), Vancouver, Canada and by the directors of the Oncology and National Hospitals and the Dean of the Faculty of Odonto-Stomatology, University of Health Sciences Ho Chi Minh City (HCMC), Vietnam. The data were collected from 1 July 2005 to 1 April 2006 and included assessments of newly admitted and confirmed clinical cases of OSCC at the Oncology hospital in HCMC, Vietnam.

The self reported data were acquired by means of a structured interview and questionnaire presented in the subject's native Vietnamese language. The Vietnamese verbatim transcription was then translated into English by one of the examiners. The structured interview consisted of patient's medical history and recall of the history of the lesion. The questionnaire included demographical data such as age, sex, occupation and geographical location. Cultural risk habits such as tobacco, alcohol abuse and betel quid use and their amount, type and frequency, tooth brushing and time for last dental visit were also recorded.

To explore the structure of oral health care in Vietnam, personal communication regarding oral health awareness, patient referral pathways and follow up of patients in southern Vietnam was carried out throughout the research. To estimate the time trends in prevalence of risk habits in Vietnamese OSCC patients, the prevalence in behavioural cultural oral risk habits was compared between patients of this study and patients from past studies. The information about OSCC patients from the previous years was acquired from online resources and available archives.

Subjects

This study examined patients assessed at the Oncology hospital. The age range of the patients was 24–85 years; there were 106 males and 55 females. Thirty-seven of these were from central Vietnam, 32 from HCMC, 35 from southeast Vietnam and 57 from southwest Vietnam. Fifty subjects were urban and 111 were rural dwellers. Of the 161 cases, 147 subjects were diagnosed with OSCC. Because of a small number, 14 subjects who were not diagnosed with OSCC were excluded from this present study. The total number of OSCC subjects included in the study was 147 including 100 males and 47 females.

Clinical assessments

The assessment included: clinical examination, imaging including computerized tomography (CT) scan and/or panoramic X-ray, pathology reports, biopsy and surgical reports.

The clinicopathological assessment of the oral cancerous lesion included type, size, location and severity of a lesion. The staging of cancer was assessed by describing the tumour size and its spread throughout the body. Other observed oral mucosal abnormalities were also described and recorded. Changes in the oral mucosa associated with betel nut chewing included lichen planus-like lesions, leucoplakia, oral submucosal fibrosis, betel chewers' mucosa (BCM) and precancerous lesions. For staging, the TNM staging system was used (23). The TNM staging system is based on the extent of the tumour (T), spread to lymph nodes (N) and metastasis spread to other parts of the body (M) (23). The nodal involvement was noted to record the advancement of the cancer to the lymph glands.

Data analyses

The SPSS version 17 (SPSS Inc., Chicago, IL, USA) statistical program was used for data analyses and included univariate and bivariate analyses. The univariate analyses were used to describe frequency distributions of demographic and risk habits. The bivariate analyses included: the independent sample *t*-test, chi-squared test or Fisher's Exact test and Spearman's correlation. The chi-squared test was used to compare frequencies of different risk habits between the genders. The mean age difference between two genders was compared by independent sample *t*-test. Spearman's correlation was used to correlate the stage of cancer with histologically assessed severity of oral cancer. Similarly, the node size was correlated with the stage of cancer and with the quantity of alcohol consumed. The quantity of cigarettes smoked per day was correlated with the quantity of alcohol consumed.

Results

The self-reported data of oral risk habit prevalence revealed that over 40% of the women with OSCC were chewing betel quid (43.5%), two women reported using betel quid and smoking (4.3%) and one (2.1%) practised all three risk habits i.e. betel quid chewing, smoking and alcohol abuse. Most of the women chewing betel quid were aged 67–85 years and in average chewed 10–20 pieces of betel quid daily. One quarter of the females used additives in their quid such as the bark of the areca tree, pomello peel or areca nut peel. Only two women used tobacco in the betel pieces yet 11 female patients practiced tobacco rubbing and sticking. None of the male patients reported to chew betel quid.

The most prevalent (91.0%) self reported risk habit for males was smoking (Table 1). The males in the age group 41–71 years old smoked most (84%) and in average for over 20 years. Two females (4.3%) reported smoking for over 20 years. Daily alcohol use was reported by 79.0% of males and by 2.1% of females. Approximately half of the males reported drinking for over 20 years and in the amount of 0.25–0.50 l per day.

The most frequent occupation and more advanced stages of oral cancer were observed in farmers. The most frequently self-reported reasons for seeking professional help at the Oncology Hospital (Fig. 1) were 'noticing an ulcer' (69.4%), 'pain' (27.2%) and 'tumour' (27.2%).

The gender patterns in the clinical characteristics of lesions are presented in Table 2. The highest percentage of males with OSCC was found in the youngest age group (24–51 years) and for females in the oldest age group (67–85 years). The most common locations of the lesion in males were the tongue (43.0%), floor of the mouth (25.0%) and the gingiva (12.0%) and for females were the tongue (38.3%), lip (21.3%) and the gingiva (17%). More than 85% of the lesions were 2 cm or larger.

In this study, two-thirds of the cases of OSCC were diagnosed at the 2nd (49 of 147) and 3rd stage of cancer (46 of 147). Approximately one-third of the subjects had at least one nodal involvement. The histology of OSCC for males and females combined was most frequently reported as OSCC Grade I. The most common reported stage of cancer for males was Stage III and for females Stage II. The more advanced stages of cancer were observed in males than in females. The gender patterns in the clinical characteristics of lesions in OSCC patients are shown in Table 2.

Although the mean age of female OSCC patients (63.6 years) was higher than the mean age of males (55.8 years), this difference was not statistically significant. The stage of cancer correlated significantly with histologically assessed severity of oral cancer (coeff. = 0.255, $P = 0.011$). Furthermore, the increase of node size correlated weakly with the later stage of cancer (coeff. = 0.260, $P = 0.007$) and with the quantity of alcohol use (coeff. = 0.262, $P = 0.023$). The average number of cigarettes smoked per day correlated with the quantity of alcohol use (coeff. = 0.252, $P = 0.030$).

A higher percentage of males (71.6%) than of females (28.4%) sought professional help early i.e. within 6 months of discovery of their oral cancer. Usually these individuals did not experience pain. However, the overall pattern of seeking professional help was not statistically significant ($P = 0.157$). There was also no significant gender difference in regard to delayed diagnosis.

Discussion

Patterns of oral squamous cell carcinoma and its risk factors and the structure of oral health care in Vietnam

A comparison of this study with past studies showed similar patterns of the prevalence and trends of risk habits and oral lesions (Table 3). In this study, the majority of oral cancer patients were farmers. The prevalence of the risk habit of smoking among male patients was high. The prevalence of smoking among males as reported in Linh's study is comparable with this study and Khanh reports the general population of males as smoking substantially lower (32.9%) than OSCC patients (66.4%) (24, 25). The prevalence of smoking in this study among females (2.1%) was only marginally different from Linh's study (0.0%) (24, 25). However, in 2000, Khanh

Table 1. **Gender differences in risk habit distribution in the oral squamous cell carcinoma Vietnamese patients (chi-squared test or Fisher's Exact test)**

Risk determinant	Males (%)	Females (%)	Total (%)
Most common risk habits			
Smoking	91.0	4.3	62.6
Alcohol	79.0	2.1	58.5
Betel quid chewing	0.0	43.5	13.7
Differences statistically significant ($P = 0.000$)			
Smoking			
Years of smoking			
No smoking	9.4	97.9	38.9
5–9 years	5.2	0.0	3.5
10–20 years	20.8	0.0	14.6
>20 years	64.6	2.1	43.1
Differences statistically significant ($P = 0.000$)			
Number of cigarettes smoked per day			
None	9.4	95.7	38.2
3–5 cigarettes per day	10.4	2.1	8.3
6–9 cigarettes per day	12.5	0.0	7.6
10–20 cigarettes per day	67.7	2.1	45.8
Differences statistically significant ($P = 0.000$)			
Alcohol use			
Years of alcohol use			
No drinking	11.8	97.9	45.6
<5 years	1.5	0.0	1.8
5–9 years	5.9	0.0	3.5
10–20 years	26.5	0.0	15.8
>20 years	54.4	2.1	33.3
Differences statistically significant ($P = 0.000$)			
Quantity of alcohol used per day			
No drinking	11.8	97.9	45.6
<¼ litre per day	14.7	Quantity unknown	8.8
¼ to ½ litre per day	48.5		29.8
½ to 1 litre per day	20.6		13.2
>1 litre per day	4.4		2.6
Differences statistically significant ($P = 0.000$)			
Betel quid use			
Years of betel quid use			
No betel quid use	100	56.5	86.3
<5 years	0.0	2.2	0.7
10–20 years	0.0	2.2	0.7
>20 years	0.0	39.1	12.3
Differences statistically significant ($P = 0.000$)			
Number of pieces of betel quid per day			
No history	100	57.8	86.9
<3 pieces	0.0	8.9	2.8
3–5 pieces	0.0	8.9	2.8
6–9 pieces	0.0	8.9	2.8
10–20 pieces	0.0	15.6	4.8
Differences statistically significant ($P = 0.000$)			
Type of areca nut			
Dry areca white lime	0.0	24.4	7.1
Fresh areca white lime	0.0	24.4	7.1
Dry areca red lime	0.0	14.6	4.3
Fresh areca red lime	0.0	17.1	5.0
Differences statistically significant ($P = 0.000$)			
Additives to betel quid			
Tobacco pieces	0.0	4.8	1.4
Bark of tree, pomello peel	0.0	12.2	3.5
Tobacco sticking	0.0	25.6	7.2
Tobacco rubbing	0.0	28.2	7.9
Differences statistically significant ($P = 0.000$)			
Brushing amount per day			
No brushing	10.1	17.1	12.0
One time	37.1	37.1	36.8
Two times	41.6	28.6	39.2
Three times	11.2	17.1	12.0

Table 1. (***Continued***)

Risk determinant	Males (%)	Females (%)	Total (%)
Differences not statistically significant ($P = 0.565$)			
Dental visit frequencies			
Never	25.8	36.0	28.6
Emergency: dental problem	68.2	64.0	67.0
Regular (annual)	6.1	0.0	4.4
Differences not statistically significant ($P = 0.328$)			

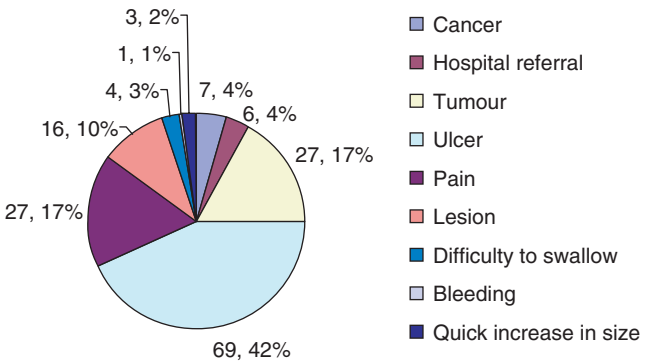

Fig. 1. Self reported reasons for seeking professional help at the Oncology Hospital.

reported that 10.0% of females from the general Vietnamese population smoked compared with a higher percentage in OSCC patients (19.9%) (5). Smoking rates in Vietnam appear to be decreasing (66.4% to 53%) (26, 27). This could be attributable to the adoption of the National Tobacco Control programme launched in 2002 and measures to restrict tobacco i.e. banning of tobacco advertisements, smoking restrictions, taxation and labelling (25).

In this study, daily alcohol use in men was highly prevalent (79.0%) and very low in women (2.1%). This substantial difference between genders in regard to smoking and alcohol use can be attributed to cultural norms in Vietnam i.e. it is not culturally accepted for women to smoke and drink. However, because of the same reason one can also expect some underestimation of prevalence in these two risk habits in female Vietnamese patients. Comparison with Linh's study from 7 to 10 years earlier revealed that there may be an increase (20%) in alcohol use among male OSCC patients. None of the females reported alcohol use in Linh's study, and only a few reported this habit in this study. In Khanh's study (5), alcohol abuse among males was similar in Hong's and Linh's study of OSCC patients. The present study found that the majority of men who drank alcohol also smoked cigarettes. Seemingly, alcohol abuse appears to be rising among males. The prevalence of the risk habits of smoking and alcohol abuse among males was higher in OSCC patients than reported in Khanh's general population study (5). However, the prevalence of these habits was lower in females from this study than in females from Khanh's general population study (5).

At the 2006 'Oral Cancer of Asia Pacific' conference proceedings of Malaysia (28), a study performed in a suburb of Ho Chi Minh City, Hoc Mon, report the habit of betel nut chewing much higher in women of their study (45.6%) compared with the general population of Vietnam (6.7%) (29). It was reported that 81.7% of betel nut users in south Vietnam add tobacco by 'rubbing and sticking' it between their lips and cheeks (28). In this study, approximately half of the females who chewed betel nut also used tobacco rubbing and sticking. However, the prevalence of female OSCC patients chewing betel nut in this study was substantially lower than in Dr. Linh's study. In Khanh's study of the general population (5), only 4.17% females reported to chew betel quid, while the majority of the OSCC female patients in Khanh's study (71.5%) and Hong's study (64.8%) chewed betel quid. This difference might be related as a possible positive trend towards the reduction of betel quid chewing and increased oral health awareness among females. Further positive change is that less females in this study than in the past chewed betel quid with tobacco added. Khanh's study reported that the risk of betel quid chewers using tobacco and developing oral precancerous and cancerous lesions is three times higher than those of betel quid chewers without the use of tobacco (5). To reduce health risks and consequently prevent occurrence of oral cancer, it is important to launch population-based health education campaigns for increasing knowledge about cancer and its related risks.

A comparison between studies in regard to the patterns of OSCC, the location of the oral cancer lesions and prevalence of oral cancer cases can be compared directly as standardized measurements were used in these studies. This study found that clinical staging of the majority of OSCC male patients was at a higher stage (III) than for females (II). In Linh's study (1993–1996) and Vi's study (1998–1999), the most frequently reported oral cancer among males and females was at the most advanced stage IV (30, 31). However, in Hong's study (2001–2002), the advanced stage III was the majority of cases of oral cancer staging (32). According to Lan's conference report of a study from 2005, the diagnosis of oral cancer was most frequently observed at stages III and IV (33). All these studies show the trend of late cancer diagnosis which has dramatic implications, i.e. morbidity is imminent. Although this study showed a possible slight decrease of later staging of oral cancer diagnosis in comparison with earlier studies, late staging was still prevalent as almost half of the females and more than half of the males were diagnosed at late stages (III or IV) of OSCC. The grade distribution of oral cancer was similar among different Vietnamese studies. These findings may mean

Table 2. **Gender patterns in clinical characteristics of lesions in oral squamous cell carcinoma patients (chi-squared test or Fisher's Exact test)**

	Males (%)	Females (%)	Total (%)
History of lesion			
<6 months	79.6	66.7	76.2
6 months	8.2	8.9	9.1
7 months–1 year	10.2	15.6	11.9
>1 year	2.0	8.9	2.8
Differences not statistically significant (P = 0.193)			
Clinical characteristics of lesions			
Exophytic	49.0	44.7	47.6
Ulcer	24.0	21.3	22.4
Infiltration	8.0	6.4	7.5
Combined	12.0	17.0	14.3
Others	7.0	10.6	8.2
Differences not statistically significant (P = 0.709)			
Size of lesion			
0–1 cm	5.4	2.2	4.3
>1 cm–2 cm	8.6	0.0	5.8
>2–3 cm	32.3	40.0	33.8
>3–4 cm	29.0	26.7	28.8
>4 cm	24.7	31.1	27.3
Differences not statistically significant (P = 0.215)			
Stage of cancer			
No information	1.0	2.1	0.0
Stage I	9.0	12.8	11.0
Stage II	30.0	40.4	32.9
Stage III	33.0	27.7	31.5
Stage IV	27.0	17.0	24.7
Differences not statistically significant (P = 0.460)			
SCC grade			
Grade I	55.6	60.9	56.5
Grade II	38.4	32.6	36.7
Grade III	6.1	6.5	6.8
Differences not statistically significant (P = 0.653)			
Nodal involvement			
None	46.0	63.8	52.4
1 node	36.0	23.4	31.3
2 nodes	14.0	12.8	16.3
>2 nodes	4.0	0.0	0.0
Differences not statistically significant (P = 0.162)			
Type of leucoplakia			
Homogeneous	2.1	4.7	2.9
Non-homogeneous	0.0	2.3	0.7
Differences not statistically significant (P = 0.220)			
Location			
Tongue	43.0	38.3	41.5
Floor of the mouth	25.0	4.3	17.7
Lip	3.0	21.3	8.8
Gingiva	12.0	17.0	13.7
Retromolar mucosa	8.0	4.3	6.1
Buccal mucosa	2.0	10.6	5.4
Palate	7.0	4.3	6.8
Differences statistically significant (P = 0.000)			
Treatment			
Radiation (external)	89.6	66.7 (P = 0.002)	81.7
Radiation (internal)	11.6	9.1 (P = 0.776)	10.7
Chemotherapy	2.1	2.4 (P = 1.00)	2.2
Surgery	35.4	56.5 (P = 0.010)	43.4
No treatment	0.0	2.2 (P = 0.655)	0.7

that access to health care in Vietnam is limited, economical resources are not sufficient, and/or individuals fear to seek health care or are unaware when they should seek professional help. All these aforementioned reasons might lead to the late diagnosis of cancerous lesions. This may also be attributable to the lack of training of health care professionals and the lack of awareness of oral cancer, as well as its related risk habits among both patients and their health care providers.

Table 3. **Time Trends – A comparison of risk behaviours of studies in Vietnam**

Studies	Present study (2005–2006)		Linh (1993–1996)		Vi/Lan (1998–1999)		Khanh (1996–1997)	Hong (2000–2002)	
Sample	Oral squamous cell carcinoma patients		Oral cancer patients		Oral cancer patients		General population	OSCC patients	
Sample size	147 cases		1084 cases		304 cases		9000 subjects	110 cases	
	Males (M, %)	Females (F, %)	Males (M, %)	Females (F, %)	Males (M, %)	Females (F, %)	Males & Females (M&F, %)	Males (M, %)	Females (F, %)
Lesion location									
Tongue	43.0	38.3	41.9	22.3	43.9	23.1	18.6	47.3 M&F	
Floor of the mouth	25.0	4.3	17.4	4.2	16.6	4.8	Unknown	10.0 M&F	
Gingiva	12.0	17.0	12.1	18.4	12.7	15.0	8.53	9.1 M&F	
Lip	3.0	21.3	2.9	21.2	4.5	22.4	13.3	12.7 M&F	
Hard palate	7.0	4.3	17.1	6.8	15.3	6.8	Unknown	7.3 M&F	
Buccal mucosa	2.0	10.6	8.6	27.1	7.0	27.9	30.7	12.7 M&F	
Retromolar mucosa	8.0	4.3	Included with palate	Included with palate	Unknown	Unknown	29.0	Unknown	
Average age (years)									
	55.8	63.6	64.0	64.0	63.0 M&F	63.0 M&F	15.0–75.0	61.0 M&F	
Risk habit									
Smoking	91.0	4.3	89.4	Unknown	Unknown	Unknown	32.9 M, 10.0 F	87.5	Unknown
Alcohol	79.0	2.1	59.4	Unknown	Unknown	Unknown	54.1 M, 6.3 F	63.3	Unknown
Betel quid	00.0	43.5	00.0	76.1	00.0	Unknown	0.00 M, 4.17 F	00.0	64.8
Smoking and alcohol	85.0	Unknown	Unknown	Unknown	Unknown	Unknown	73.2 M&F	63.3	Unknown
Smoking patterns									
Number of years of smoking									
No smoking	9.0	95.7			7.6 M&F			12.5	
<5 years	4.2	2.1			3.1 M&F			19.7 (for	
5–9 years	5.9	0.0			3.7 M&F			<20 years	
10–20 years	26.5	0.0			15.9 M&F		32.9 M	67.8	
>20 years	54.4	2.1			69.5 M&F				
Number of cigarettes smoked per day									
None	9.4	95.7							
3–5 per day	10.4	2.1					23.1 M		
6–9 per day	12.5	0.0					60.8 M		
10–20 per day	67.7	2.1					16.2 M		
Alcohol patterns									
Years of alcohol use									
No drinking	11.8	97.9							
<5 years	1.5	0.0							
5–9 years	5.9	0.0							
10–20 years	26.5	0.0							
>20 years	54.4	2.1							

Table 3. (***Continued***)

	Males (M, %)	Females (F, %)	Males (M, %)	Females (F, %)	Males (M, %)	Females (F, %)	Males & Females (M&F, %)	Males (M, %)	Females (F, %)
Betel quid chewing patterns									
Years of betel chewing									
No betel chewing	100.0	56.5			100.0	36.0		100.0	35.4
<5 years	0.0	2.2			0.0	12.9		0.0	3.7 (for <20 years)
5–9 years	0.0	0.0			0.0	2.1		0.0	60.9
10–20 years	0.0	2.2			0.0	11.5		0.0	
>20 years	0.0	39.1			0.0	44.9			
Clinical characteristics of lesions									
Exophytic	49.0	44.7	52.9 M&F		51.9 M&F				
Ulcer	24.0	21.3	17.8 M&F		18.7 M&F				
Infiltration	8.0	6.4	8.5 M&F		9.5 M&F				
Combined	12.0	17.0	19.4 M&F		18.0 M&F				
Other lesion	7.0	10.6	1.4 M&F		1.9 M&F				
Size of lesion									
0–2 cm	14.0	2.2	14.9 M&F		T1: 14.5 M&F		18.0 M&F	T1: 19.2%	
>2 cm–4 cm	61.3	66.7	40.3 M&F		T2: 30.9 M&F		1.9 M&F	T2: 36.4%	
>4 cm	24.7	31.1	44.7 M&F		T3: 33.5 M&F			T3: 30.0%	
					T4: 21.1 M&F			T4: 15.4%	
Stage of cancer									
No information	1.0	2.1							
Stage I	9.0	12.8	11.8 M&F		12.5 M&F			10.9 M&F	
Stage II	30.0	40.4	20.6 M&F		17.7 M&F			23.6 M&F	
Stage III	33.0	27.7	26.8 M&F		32.3 M&F			36.4 M&F	
Stage IV	27.0	17.0	40.9 M&F		37.5 M&F			29.1 M&F	
Oral squamous cell carcinoma grade									
Grade I	55.6	60.9	60.5 M&F		57.6 M&F			50.0 M&F	
Grade II	38.4	32.6	27.7 M&F		28.9 M&F			40.0 M&F	
Grade III	6.1	6.5	4.8 M&F		4.3 M&F			7.3 M&F	
Verrucous carcinoma	0.0	0.0	3.5 M&F		4.3 M&F			2.7 M&F	

OSCC, oral squamous cell carcinoma.

Time trends in oral cancer and related risk habits in Vietnamese OSCC patients

The expectation was that the prevalence of different oral cancer risk habits such as tobacco, alcohol abuse and betel quid use would be lower in the general population in Vietnam than in the Vietnamese sample of this study. As this study examined only a sample of OSCC patients, only indirect comparisons with the general population could be made. As expected, this comparison showed that aforementioned risk habits were more prevalent among OSCC patients than among the general population in Vietnam.

As a result of population based oral health education, this study expected to observe a decrease in the prevalence of risk habits when compared with the previous studies. However, the time trend analysis showed an overall increase in risk frequency i.e. trend of more men and women using tobacco and abusing alcohol at present than in earlier years. Moreover, the prevalence of smoking among male OSCC patients has remained either at the same level over the years or even slightly increased. Similarly, the prevalence of alcohol abuse in male OSCC patients seems to be increasing. A further negative trend was observed as the age of male smokers is decreasing i.e. males start to use tobacco at an earlier age.

A positive time trend could be observed for females as chewing betel quid seems to be decreasing compared with previous years. To confirm this trend, cohort studies are needed where standardized measurements are taken which will allow direct comparisons among studies.

The time trend comparisons showed an overall trend that the prevalence of some risk habits is increasing i.e. more men and women are smoking and drinking at present than in earlier years. The comparison of this study with Linh's study (30) showed that the geographical residences of patients with OSCC have not generally changed except that there was a small (8%) increase of patients in the present study coming from the central area of Vietnam to the Oncology hospital in HCMC.

The findings of this study should be interpreted in the context of study limitations. This study, because of the specifics of its inquiry, did not employ a random sampling i.e. a convenience sample of patients admitted to the Oncology Hospital was used. Moreover, the questionnaires were verbatim translated from Vietnamese into English, therefore; the possibility of reporting bias cannot be excluded. Recall bias may also be present in the clinical retrospective study i.e. patients may not have correctly recalled all the events related to the history of the lesion and/or their risk behaviours.

An awareness of creating a healthy lifestyle and behaviour to prevent risk habits of oral cancer is dependent on changes of lifestyle, cultural norms as well as attitudes, all of which could be initiated through health education (34). Improvements in oral health are also dependent upon the implementation of public health strategies and policies focusing on the underlying broader determinants of oral diseases such as socioeconomic, cultural and environmental factors (34).

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