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BEHAVIOURAL HABITS AND ORAL CANCERS RISK AMONG THE YEMENI POPULATION: A CASE-CONTROL STUDY.

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ABSTRACT

Aims: This study aimed to determine the association between behavioural habits and oral cancers risk among Yemeni population. **Methods:** A hospital-based unmatched case-control study was conducted among 74 oral cancers cases and 74 controls. Cases and controls were recruited using convenient sampling method. The data collection was performed using a guided questionnaire consists of socio-demographic characteristics and behavioural habits. Logistic regression analyses were conducted to determine the factors associated with oral cancers. **Results:** Older age and patients living in rural residence were significantly associated with oral cancers. Behavioural habits related to poor oral hygiene status [aOR=48.89 (95% CI: 5.45-408.26), *P*<0.001] had the highest odds for oral cancers, followed by shammah consumption [aOR=3.34 (95% CI: 1.43-7.83), *P* = 0.005] among the Yemenis. **Conclusion:** Oral hygiene status and shammah consumption were modifiable behavioural habits that could be the focus for future health education and awareness programme strategies, especially among the older patients living in the rural residential area.

Keywords: **Oral cancers, Oral hygiene, Tobacco usage, Habits, Case-Control**

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Aims: This study aimed to determine the association between behavioural habits and oral cancers risk among Yemeni population. **Methods:** A hospital-based unmatched case-control study was conducted among 74 oral cancers cases and 74 controls. Cases and controls were recruited using convenient sampling method. The data collection was performed using a guided questionnaire consists of socio-demographic characteristics and behavioural habits. Logistic regression analyses were conducted to determine the factors associated with oral cancers. **Results:** Older age and patients living in rural residence were significantly associated with oral cancers. Behavioural habits related to poor oral hygiene status [aOR=48.89 (95% CI: 5.45-408.26), *P*<0.001] had the highest odds for oral cancers, followed by shammah consumption [aOR=3.34 (95% CI: 1.43-7.83), *P* = 0.005] among the Yemenis. **Conclusion:** Oral hygiene status and shammah consumption were modifiable behavioural habits that could be the focus for future health education and awareness programme strategies, especially among the older patients living in the rural residential area.

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INTRODUCTION

Globally, oral cancers has emerged as a significant cause of global public health concern.[1] The prevalence of oral cancers is particularly high among men and is the 8th most common cancer worldwide.[1] A total of 369,200 new cases of oral cancers were reported in 2012 with the majority of the cases were diagnosed in developing countries such as South and Southeast Asia.[2] The survival of oral cancers patients is poor (less than 50% for 5-year survival rate) but with advancement in treatment such as chemotherapy and radiotherapy, the survival of oral cancers patients have been improved.[3,4] The prevalence of oral cancers in Arab countries range from 1.8-2.13 per 100,000 populations with most of the patients diagnosed at the age of 50-60 years old.[5] However, in Yemen, the prevalence was higher among the younger generation (less than 45 years old).[5] According to the National Oncology Centre (NOC), oral cancers is the 5th most common cancer among the Yemenis.[6] Behavioural habits such as smokeless tobacco (Shammah and khat) consumption and cigarette smoking were strongly associated with oral cancers.[5] The hospital-based study also showed a very high preva-

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prevalence of oral cancers in Yemen, where such behavioural habits are common.[7] Hodeida city had the highest prevalence of oral cancers.[6] However, there is limited information regarding the association of behavioural habits with oral cancers among the Yemenis in Hodeida city. Thus this study objective is to determine the associations between behavioural habits such as smokeless tobacco usage, smoking tobacco, habitual diet and oral hygiene status with oral cancers in Yemen.

MATERIALS AND METHODS

An unmatched case-control study was conducted among patients from two hospitals in the Hodeida governorate. The total sample size required for this study was 148 (74 cases and 74 controls) with 80% study power and at 5% significant level. The period for data collection was seven months from December 2013 to June 2014. The convenient sampling method was used to recruit the cases and controls. Cases were recruited from the Al-Amal Center of Cancer Treatment and controls were recruited from Althawra Hospital in Hodeida (approximately 2km apart). Cases with medically confirmed oral cancers were included, and cases with an unstable medical condition such as shortness of breath were excluded from the study. Controls with prior assessment and free from oral cancers or other oral-related cancers were included in this study. Controls with an unstable medical condition were also excluded from this study.

The data collection was conducted using a self-constructed and pre-tested questionnaire (See Appendix). After the informed consent taken from the respondents, a face to face guided interview done by trained interviewers, who were not blinded to the objectives of the study. Data were analysed by using the Statistical Package for Social Science (SPSS) version 20. Descriptive analyses were used to describe the categorical and continuous variables, and Chi-square and t-test were performed to analyse the associations of patients' socio-demographic characteristics and oral cancers. Logistic regression analyses were conducted to obtain the crude odds ratio (cOR) and adjusted (aOR) and their 95% confidence interval (CI), as well as to determine the factors associated with oral cancers. The significance level in this study was set at $P < 0.05$.

RESULTS

Table 1 shows the mean age for the cases were significantly higher than the control group ($P = 0.003$). Percentages of female and not working patients among the cases was higher compared to control [(54.1% vs 50.0%) and (75.7% vs 63.5%), respectively]. There was a significantly higher percentage of patients living in the rural area among the cases (70.3%) compared to controls (41.9%), $P = 0.035$.

Table 2 depicts the behavioural habits of patients. For smokeless tobacco usage, the percentages of patients chewing khat and shammah usage were higher among the cases compared to controls. The mean total duration of shammah usage among cases was significantly longer than those for controls (25.35 vs 18.44, $p=0.01$). For tobacco smoking, cases who smoked cigarettes had a shorter total duration of smoking compared to control ($p<0.001$) but longer for cases who smoked shisha instead ($p=0.003$). Percentage distribution among the cases compared to control for alcohol, vegetables, fruits, spicy foods and hot drinks consumptions were almost balanced. However, there was a higher percentage of patients with poor oral hygiene status among the cases (compared to controls (98.6% vs 54.1% respectively, $p<0.001$).

Table 3 shows the factors associated with oral cancers. Based on multivariate regression analysis, only factors such as age

Table 1: Patients' socio-demographic characteristic and association with oral cancer.

Variables		Cases			Controls			*p*
		Mean (SD)	n	%	Mean (SD)	n	%	
Age in years		53.5 (16.4)			41.5 (18.2)			*0.003*[a]
Gender	Male		34	45.9		37	50.0	*NS*
	female		40	54.1		37	50.0	
Occupation	Working		18	24.3		27	36.5	*NS*
	Not working		56	75.7		47	63.5	
Residential area	Rural		52	70.3		31	41.9	*0.035*[b]
	Urban		22	29.7		43	58.1	
Education duration	<12years		7	9.5		19	25.7	*NS*
	≥12years		4	5.4		14	18.9	
	Not educated		63	85.1		41	55.4	
Family history of oral cancer	Yes		8	10.8		7	9.5	*NS*
	No		66	89.2		67	90.5	

[a]*t*-test; [b] chi-square test; NS = Non-significant, *p>0.05*

Table 2: Patients' behavioural habits as modifiable risk factors for oral cancers, comparison between cases and controls.

Variables		Cases			Controls			*p*
		Mean(SD)	n	%	Mean(SD)	n	%	
Khat chewing	Yes		86.5	64		70.3	52	***0.017***
	No		13.5	10		29.7	22	
	Duration (years)	21.16(13.32)			17.21(11.66)			*NS*
	Frequency (week)	5.83(2.77)			4.98(2.65)			*NS*
	Duration of each session (hours)	3.73 (2.35)			3.23(2.09)			*NS*
Shammah usage	Yes		71.6	53		25.7	19	***<0.001***
	No		28.4	21		74.3	54	
	Duration (years)	25.35(14.90)			18.44(17.42)			***0.010***
	Frequency (day)	10.23(8.15)			6.72(3.97)			***0.001***
Cigarette smoking	Yes		16.2	12		17.6	13	*NS*
	No		83.8	62		82.4	61	
	Duration (years)	7.57(10.32)			16.38(12.21)			***<0.001***
	No of Cigarette	11.29(9.73)			13.92(11.69)			*NS*
Shisha smoking	Yes		47.3	35		37.8	28	*NS*
	No		52.7	39		62.2	46	
	Duration (years)	19.83(13.94)			13.59(10.86)			***0.003***
	Frequency (day)	2.20(1.84)			1.89(1.15)			*NS*
Alcohol drinking	Yes		1.4	1		0.0	0	*NS*
	No		98.6	73		100.0	74	
Vegetables consumption	Yes		100.0	74		98.6	73	*NS*
	No		0.0	0		1.4	1	
Fruits consumption	Yes		100.0	74		98.6	73	*NS*
	No		0.0	0		1.4	1	
Spicy food consumption	Yes		58.1	43		54.1	40	*NS*
	No		41.9	31		45.9	34	
Hot drinks consumption	Yes		48.6	36		47.3	35	*NS*
	No		51.4	38		52.7	39	
Oral hygiene status	Good		45.9	34		1.4	1	***<0.001***
	Poor		54.1	40		98.6	73	

Table 3: Modifiable and non-modifiable risk factors associated with oral cancer(s) among the Yemeni population.

Demographic Factors		**cOR[a]**	**95% CI**	***p* value**	**aOR[b]**	**95% CI**	***p* value**
Age (years)		1.04	1.02,1.06	*<0.001*	3.72	1.77,10.32	0.034
Gender	Female	1		*NS*	-	-	-
	Male	1.18	0.62,2.24		-	-	
Occupation	Not working	1		*NS*	-	-	-
	Working	1.79	0.88,3.64		-	-	
Education duration	<12 years	1			-	-	
	≥12 years	0.74	0.18,3.02	*NS*	-	-	-
	Not educated	3.86	1.48,10.04		-	-	
Residence	Urban	1		*NS*	1		0.004
	Rural	3.28	1.66,6.47		3.55	1.50,8.39	
Family history of oral cancer	No	1		*NS*	-	-	-
	Yes	1.16	0.40,3.38		-	-	
Behavioral habits		**cOR[a]**	**95% CI**	***p value***	**aOR[b]**	**95% CI**	***p* value**
Khat chewing	No	1		*0.026*	-	-	-
	Yes	2.59	1.12,5.97		-	-	
Shammah usage	No	1		*<0.001*	1		0.005
	Yes	7.17	3.47,14.84		3.34	1.43,7.83	
Cigarette smoking	No	1		*NS*	-	-	-
	Yes	1.1	0.47,2.60		-	-	
Shisha Smoking	No	1		*NS*	-	-	-
	Yes	1.47	0.77,2.84		-	-	
Spicy food consumption	No	1		*NS*	-	-	-
	Yes	0.85	0.44,1.62		-	-	
Hot drinks consumption	No	1		*NS*	-	-	-
	Yes	0.95	0.50,1.81		-	-	
Oral hygiene status	Good	1			1		
	Poor	0.02	0.01,0.12	*<0.001*	48.89	5.85,408.26	<0.001

[a] crude odds ratio (simple logistic regression); [b] adjusted odds ratio (multiple logistic regression)

[aOR=3.72 (95% CI 1.77,10.32), p = 0.034], residential area [aOR=3.55 (95% CI 1.50,8.39), P = 0.004], shammah usage [aOR=3.34 (95% CI 1.43,7.83), p = 0.005] and oral hygiene status [aOR=3.48.89 (95% CI 5.85,408.26), p < 0.001] were significant independent predictors for oral cancers.

DISCUSSION

This study showed that poor oral hygiene and smokeless tobacco consumption (shammah and khat usage), two modifiable behavioural habits, were independent predictors for development of oral cancers in Yemeni population in Hodeida city. Oral hygiene is essential for all individual to reduce incidence of oral disease. Poor oral hygiene may due to infrequent tooth brushing or using the chewing sticks. [8, 9] Our findings on poor oral hygiene and the risk of oral cancers were in agreement with previous studies. [8,10,11]

Our study confirmed that shammah usage increases the risk of developing oral cancers compared to control. Shammah is a preparation of a mixture of powdered tobacco, lime, ash, black pepper, oils and flavourings, which is frequently used in the Arabian Peninsula, especially in Saudi Arabia. [12] The use of shammah will increase the risk of oral leukoplakia-like lesions and could induce later development of oral cancers.[13,14] Our study findings mirrored other similar studies carried out in middle-eastern Arab countries which showed a significant association of shammah

usage with increased risk of developing oral cancers. [15,16]

Based on our findings, other factors not related to behavioural habits, such as age and geographical area of residence are significant risk factors for developing oral cancers. However, because we have recruited our controls from another hospital and did not match them for age or genders, these may have introduced sampling bias which may account for the significant findings. Despite this, several studies have previously reported that increasing age is associated with higher risk of developing oral cancers reflecting our study findings which showed the risk of developing oral cancers increases by 3.72 times for every year increase in age.[17,18] Similarly since controls were recruited from Althawra Hospital, which is located in the city center while the Al -Amal center for cancer treatment is situated in the outskirts of the city, this may have influence the catchment of mainly rural patients as cases compare to the controls. Furthermore, patients from the Althawra hospital, coming from the city center may have better oral hygiene education compare to the cases from the rural area. The knowledge of oral cancers patients in the rural area especially regarding risk behaviour and screening methods has been shown to be low.[19]

There were few limitations in our study. The unmatched case-control design exposed the study to sampling bias as mentioned above. Data collections through interview lead to recall bias. In this case, the cases tend to report more on usage or exposure. In the process interview, we did not blind the interviewers of the study objective. This may lead to possibility of interviewer bias in this study. Despite the study limitations, the results could serve as baseline data for future prospective studies.

CONCLUSION

Both non-modifiable (Age and rural residence) and modifiable factors (behavioural habits such as poor oral hygiene and smokeless tobacco consumption) have a significant association with oral cancers. The modifiable behavioural habits above could form focus for future health education and awareness programme strategies, especially among the older patients living in the rural residential area.

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AUTHOR'S CONTRIBUTIONS

All authors contributed to the processes of writing, revising editing of the paper and approved the final version for publication.

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