

A Study on Oral Mucosal Lesions among Adult Siamese Ethnic Group in Kelantan

Jessina Sharis O^a, Azizah Y, Normastura AR and Rusdi AR

^a School of Dental Sciences, Health Campus, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia

ABSTRACT: Oral health is integral to general health. Behavioural risk factors such as smoking, alcohol drinking and quid chewing may play a role in triggering the initiation and progression of oral mucosal lesions. The objectives of this study were to determine the prevalence and the associated risk habits of oral mucosal lesions among adult Siamese ethnic group in Kelantan. Salivary parameters and their associations with quid chewers having oral mucosal lesions were also determined. A cross sectional study involving 564 Siamese adults was conducted at 14 Siamese villages. Multistage sampling method was applied and respondents underwent an interview, saliva testing and followed by clinical oral examination. Saliva properties were assessed using BUFFER[®] TEST KIT- by GIC Co. Systematic procedures for clinical oral examination was performed. Data was analyzed using SPSS version 12.0. The prevalence of oral mucosal lesions was 46.3% (95% CI; 42.0, 50.0). Analysis revealed that smokers, alcohol drinkers, quid chewers, denture users and those with increasing age were more likely to have oral mucosal lesions. There was an association between quid chewers having oral mucosal lesions and resting saliva pH. Resting saliva pH showed significant difference ($p < 0.001$) between quid chewers who had oral mucosal lesions and non-quid chewers who had no lesions.

Keywords: Oral mucosal lesions, behavioural risk factors, salivary parameters, quid chewing

Introduction

Oral health is integral to general health and is essential to the well being of all individual. Lesions of the oral mucosa may cause impaired speech, impaired mastication and swallowing, impaired in food taste, impaired retention of prostheses, impaired facial and peri-oral aesthetics and pain, which will interfere with daily social activities (Triantos, 2005).

The cognizance of sociobehavioural factors in oral diseases has been shown in various socioepidemiological surveys. Behavioural risk factors such as tobacco consumption, alcohol drinking and quid chewing habit have been positively associated with oral mucosal lesions (Harris *et al.*, 2004). However, there is still limited data and studies on the effect of alcohol on oral mucosal lesions (Harris *et al.*, 2004; Saraswathi *et al.*, 2006; Rooban *et al.*, 2009). The multiethnicity of the Malaysian population is accompanied by variations in oral habits practiced.

Saliva plays an important role in the maintenance of oral health by exhibiting multiple host defense functions. These include homeostatic processes, lubrication, antimicrobial activity and in the balancing of the demineralization/remineralization process (Lamkin and Oppenheim, 1993). Since saliva is important in maintaining the integrity of the oral mucosa by protecting it against soft-tissue damage (Dawes, 2008), analysis of the saliva is useful to verify the risk factors that lead to the development of oral mucosal lesions (Lee *et al.*, 2002).

Limited studies had been conducted on the influence of quid chewing on salivary parameters (Khan *et al.*, 2003; Rooban *et al.*, 2006). In Malaysia, there is no known published study regarding the association of salivary parameters and quid chewing. Therefore, the aim of this study was to measure salivary parameters according to quid chewing status.

Materials and Method

A cross-sectional study was conducted from December 2008 to May 2009 at fourteen randomly selected Siamese villages in the state of Kelantan, Malaysia. The study involved 564 Malaysian Siamese adults who fulfilled the inclusion criteria and consented to the study. The reference population was all Malaysian Siamese adults in

Corresponding Author:

Jessina Sharis O

School of Dental Sciences

Health campus, Universiti Sains Malaysia

16150 Kubang Kerian, Kelantan.

Email: jcsharis@yahoo.com

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Kelantan and the source population were Malaysian Siamese adults residing in the 30 Siamese villages in Kelantan. The inclusion criteria were adults aged 30 to 80 years (NOHSA, 2000, Lin *et al.*, 2001). Adults with history of systemic illness, on long term medication, radiotherapy treatment and pregnant mothers were excluded to avoid any influence on saliva quality (Puy, 2006). Sample size was calculated prior to the study using PS Power and Sample Size Calculation Program® (Dupont and Plummer, 1997). With anticipation of 20% non response rate, the final sample size calculated was 557 subjects.

Respondents were interviewed using a validated questionnaire. Data on socio-demographic factors (including smoking, alcohol and quid chewing status) and denture wearing were obtained. Respondents with quid chewing habit were involved in saliva testing procedure. Non-quid chewers whose age range was comparable to the age range of those with quid chewing habit were then selected to become the non-quid chewers group.

Saliva collection procedure was done before clinical examination of the oral mucosa. Measurement of salivary parameters (salivary flow rates, resting pH and buffering capacity) were done using Saliva-Check BUFFER® by GIC Co. (Japan). The procedure was performed between 9:00 am to 12:00 pm to avoid diurnal variation (Robin *et al.* 2006). Clinical oral examination was then conducted to determine the oral mucosal lesion status of respondents. Training and calibration for the examiner on the clinical diagnosis of oral mucosal lesions were conducted prior to the study by an Oral Maxillofacial Surgeon. Clinical diagnosis of oral mucosal lesions was based on Clinical Criteria for Diagnosis of Oral Mucosal Lesions by Axéll *et al.* (2002).

Data were analyzed using SPSS version 12.0. Descriptive statistics such as mean and standard deviation (SD) for continuous variables and frequency and percentages for categorical variables were calculated. Associated factors for oral mucosal lesions were determined by logistic regression. Regression analyses were undertaken to determine the relationship between salivary parameters and quid chewers with oral mucosal lesions. As for comparing mean for the differences in salivary parameters between quid chewers and non quid chewers, independent sampled t-test and analysis of variance (ANOVA) were conducted. Level of significance was set at 0.05.

Results and Discussion

A total of 564 respondents consented and participated in the study. **TABLE 1** illustrates the socio-demographics characteristics of the respondents. There were 215 (38.1%) denture wearers in the study population.

Nearly half (46.3%) of the respondents (95% CI: 42.0, 50.0) had one or more oral mucosal lesions. The prevalence of oral mucosal lesions was 46.2% among the males and 46.3% among the females respectively; with no statistical significant difference observed between genders ($p= 0.987$). The most common oral mucosal lesion was denture stomatitis (17.4%), followed by chewer's mucosa (10.3%) and frictional lesion (6.4%). Pre-malignant lesions were observed in 1.2% of the population. **TABLE 2** shows the distribution of various oral mucosal lesions in relation to gender.

TABLE 3 described the associated factors for oral mucosal lesions. Multiple logistic regression analysis showed significant associations between oral mucosal lesions and smoking habit with odds ratio (OR) 2.88 (95% CI=1.67, 4.97), alcohol drinking OR 3.05 (95% CI=1.64, 5.66), quid chewing habit OR 5.32 (95% CI=3.79, 9.10), denture wearing OR 5.97 (95% CI=3.85, 9.29) and age OR 1.02 (95% CI=1.01, 1.04).

There was a significant association between resting saliva pH and quid chewing habit ($p<0.001$). The mean salivary pH for quid chewers with oral mucosal lesions was 6.3 (SD 0.06) and mean pH for non quid chewers with no lesions was 7.0 (0.04). The difference was statistically significant ($p <0.001$) (**TABLE 4**).

The prevalence of oral mucosal lesions in this study was 46.3% (95% CI: 42.0, 50.0), corresponding to the range of expectation of 12%-60% (Lin *et al.*, 2001; Garcia-Pola *et al.*, 2002; Harris *et al.*; 2004). The variations in prevalence may be due to differences in the geographic areas of the studied populations and types of oral mucosal lesions included in the studies. The prevalence of oral mucosal lesions in this study was similar to the study by Zain *et al.* (1999) which was conducted on the Indian ethnic group (45.5%) in Malaysian estates. The most common oral mucosal lesion encountered was denture stomatitis (17.4%), which was comparatively higher than that observed by Shulman *et al.* (2004) in the U.S. (8.4%) and Matthew *et al.* (2008) in India (0.8%). The relatively high proportion of denture wearers (38.1%) may contribute to the high prevalence. As for premalignant lesions, the prevalence was found to be 1.2%, similar to that observed by Muznita *et al.* (1999) (1.4%).

TABLE 1- Distribution of Socio-demographic Characteristics of Respondents (n=564)

Variable	Mean (SD)	Freq (%)
<i>Sex</i>		
Male		199 (35.3)
Female		365 (64.7)
<i>Age (years)</i>		
	55.4 (0.57)	
Male	56.6 (0.95)	
Female	54.8 (0.72)	
<i>Age (years)</i>		
30-39		85 (15.1)
40-49		125 (22.2)
50-59		125 (22.2)
60-69		130 (23.0)
≥ 70		99 (17.6)
<i>Education level</i>		
No formal education		256 (45.4)
Primary education		159 (28.2)
Secondary education		144 (25.5)
Tertiary education		5 (0.9)
<i>Job categorization</i>		
Unemployed		219 (38.8)
Private/government		13 (2.3)
Self employed		331 (58.7)
Pensioner		1 (0.2)
<i>Smoking status</i>		
Current smoker		120 (21.3)
Non smoker		419 (74.3)
Ex-smoker		25 (4.4)
<i>Alcohol drinking status</i>		
Current drinker		89 (15.8)
Non drinker		466 (82.6)
Ex-drinker		9 (1.6)
<i>Quid chewing status</i>		
Current chewer		83 (14.7)
Non quid chewer		481 (85.3)

TABLE 2- Distribution of Oral Mucosal Lesions According to Gender

Oral Mucosal Lesions ^a	Male (n=92)	Female (n=169)	Total (n=261)
	n (%)	n (%)	n (%)
<i>White Lesions</i>			
Homogenous leukoplakia	1 (0.5)	0	1 (0.2)
Non-homogenous leukoplakia	1 (0.5)	0	1 (0.2)
Lichen planus	3 (1.5)	1 (0.3)	4 (0.7)
Geographic tongue	2 (1.0)	3 (0.8)	5 (0.9)
Cheek and lip biting	1 (0.5)	3 (0.8)	4 (0.7)
Frictional lesion	26 (13.1)	10 (2.7)	36 (6.4)
Leukoedema	26 (13.1)	0	26 (4.6)
<i>Red Lesions</i>			
Denture stomatitis	12 (6.0)	86 (23.6)	98 (17.4)
Erythroplakia	0	1 (0.3)	1 (0.2)
<i>Ulcerated Lesions</i>			
Aphthous ulcers	3 (1.5)	5 (1.4)	8 (1.4)
Traumatic ulcers	7 (3.5)	9 (2.5)	16 (2.8)
<i>Quid related Lesions</i>			
Chewer's mucosa	10 (5.0)	48 (13.2)	58 (10.3)
Quid-induced lesions	1 (0.5)	5 (1.4)	6 (1.1)
<i>Exophytic and pigmented lesions and mucosal swellings</i>			
Suspicious of oral cancer	1 (0.5)	0	1 (0.2)
Mucocoele	3 (1.5)	5 (1.4)	8 (1.4)
Papilloma	0	1 (0.3)	1 (0.2)
Fibroepithelial polyp	0	2 (0.5)	2 (0.4)
Excessive melanin pigmentation	10 (5.0)	11 (3.0)	21 (3.7)
Amalgam tattoo	0	1 (0.3)	1 (0.2)
Fordyce's condition	1 (0.5)	0	1 (0.2)

^a Difference of prevalence for oral mucosal lesions between male and female was not significant (Chi-square test; $p=0.987^*$).

* Significant at $p<0.05$.

TABLE 3- Associated Factors for Oral Mucosal Lesions (n=564)

Variables	Adjusted OR ¹	95% Confidence Interval (CI)	p value
Age (years)	1.02	(1.01,1.04)	0.003*
Smoking status			
Smoker	2.88	(1.67,4.97)	<0.001*
Non smoker	1.00		
Alcohol drinking status			
Alcohol drinker	3.05	(1.64,5.66)	<0.001*
Non alcohol drinker	1.00		
Quid chewing habit			
Quid chewer	5.32	(3.79,9.10)	<0.001*
Non quid chewer	1.00		
Denture wearing			
Yes	5.97	(3.85,9.29)	<0.001*
No	1.00		

*significant at p<0.05; ¹ Adjusted odds ratio in multiple logistic regression.

TABLE 4- Comparison of Saliva pH between Quid Chewers and Non Quid Chewers (n= 132)

Group	Mean (SD)	Mean diff. (95% CI)	F stat.(df)*	p-value
Quid chewers (n=64)	6.3 (0.06)			
Non quid chewers (n=68)	7.0 (0.04)	0.73 (0.59, 0.87)	111.5 (1, 130)	<0.001

* One-way ANOVA

Smoking may increase the odds of oral mucosal lesions by 2.88 (95% CI: 1.67, 4.97). This finding was true as had been demonstrated by other studies (Lin *et al.*, 2001; Harris *et al.*, 2004; Jahanbani, 2009). Alcohol drinkers were also more likely to have oral mucosal lesions which concurred with the study by Harris *et al.* (2004) and Rooban *et al.* (2009). Quid chewing habit was found to be associated with the occurrence of oral mucosal lesions. These findings were also consistent with a study by Yap *et al.* (2008) who reported that quid chewers were 4.5 times higher to have oral mucosal lesions (95% CI :1.20, 16.94).

There was a significant difference of mean saliva pH between the quid chewers and non-quid chewers in this study. The mean saliva pH in quid chewers was significantly lower compared to the non-quid chewers ($p<0.001$). This result is in accordance with the study by Rooban *et al.* (2006). Among the quid chewers, the lime in the quid ingredient probably reacts with the bicarbonate buffering system in the saliva by the loss of bicarbonate, turning the saliva of quid chewers to be more acidic (Rooban *et al.*, 2006). An acidic oral environment can cause various oral diseases such as *candida albicans* infection (Choo and Huestis, 2004).

Conclusion

There was a high prevalence of oral mucosal lesions (46.3%) in the Siamese adult population. Oral mucosal lesions were associated with risk habits such as smoking, alcohol drinking and quid

chewing. Resting saliva pH showed a significant difference ($p<0.001$) between quid chewers with oral mucosal lesions and non-quid chewers.

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