Research & Reviews: Journal of Dental Sciences

e-ISSN: 2320-7949
p-ISSN: 2322-0090

Carbonated Drinks May Alleviate Oral Submucosal Fibrosis: Analysis of Oral Health Screening Data in a Tropical Reefs

Xiaoqian Qiu, Ruiyong Chen*

Department of Stomatology, Changhai Hospital of Naval Medical University, Shanghai, China

Research Article

Received: 10-Jul-2023, Manuscript No. JDS-23-105358; **Editor assigned:** 12-Jul-2023, Pre QC No. JDS-23-105358 (PQ); **Reviewed:** 26-Jul-2023, QC No. JDS-23-105358; **Revised:** 13-Jan-2025, Manuscript No. JDS-23-105358 (R); **Published:** 20-Jan-2025, DOI: 10.4172/2320-7949.13.1.002

***For Correspondence:** Ruiyong Chen, Department of Stomatology, Changhai Hospital of Naval Medical University, Shanghai, China;

E-mail: Chenruiyong_nmri@163.com

Citation: Chen R, et al. Carbonated Drinks May Alleviate Oral Submucosal Fibrosis: Analysis of Oral Health Screening Data in a Tropical Reefs. RRJ Dent Sci. 2025;13:002.

ABSTRACT

Objectives: It is deserved attention whether there are specific oral health problems in the long term resident populations on the tropical reefs.

Methods: Oral health screening data of a unit on a South China Sea reef, 55 males, 26.35 ± 3.98 years old, were collected. The oral disease distribution and their relationship with habits of the smoking, betel nut chewing, and carbonated drinking were analysed.

Results: The top three oral problems were dental calculus (67.27%), abnormal eruption of wisdom teeth (47.27%) and periodontitis (36.36%). dental calculus was correlated with periodontitis (r=0.465, P=0.000), beverage drinking habit (r=0.277, P=0.041), and betel nut chewing habit (r=-0.276, P=0.041). 7 cases (12.7%) of Oral Submucosal Fibrosis (OSF) were diagnosed. Those who smoked more than 10 years and chewed betel nut every day for many years were more likely to develop OSF (P=0.000). Those had carbonated beverage drinking habit had lower incidence of OSF (P=0.002), even they chewing betel nuts or smoking.

Conclusions: The residents in tropical reefs are needed to pay more attention on the oral health conditions. Carbonated drinks may neutralize and alleviate the damage of betel nut alkaloids or nicotine to OSF.

Clinical relevance for the first time, it was observed that carbonated drinks might prevent the occurrence of OSF in betel nut chewing and smokers, although its certainty and potential mechanism need to be clarified and explored.

Keywords: Dental Disease; Oral Submucous Fibrosis (OSF); Habits; Chewing betel nuts; Carbonated beverage

e-ISSN: 2320-7949
p-ISSN: 2322-0090

INTRODUCTION

Carbonated drinks may alleviate oral submucosal fibrosis: Analysis of oral health screening data in a tropical reef

The unique environment of tropical islands and reefs has a clear impact on health. There are many tropical islands and reefs in the South China Sea. With the development of marine economy, the population living on islands and reefs is expanding, which brings greater demand for more dental health serves. The early literature has reported The spectrum of oral diseases in large scale on these islands. In recent years, with the improvement of those reefs living condition, the disease spectrum of people stationed on islands and reefs will also change. During the service of the department of stomatology in an island reef hospital in a certain reef, the authors found that the disease spectrum of the department of stomatology had changed, and there were many cases of Oral Submucous Fibrosis (OSF) not reported in the above literature. The latter is a common problem in tropical Asia and island populations, with a high risk of oral cancer. Therefore, the oral health screening data of a unit in a tropical reefs of the South China Sea were collected and made a retrospective analysis focus on the relationship between lifestyle and OSF, so as to provide a reference for the deployment of oral health support forces for the soldiers and civilians stationed on the islands and reefs [1].

MATERIALS AND METHODS

Subjects

All members of a squadron stationed on an island or reef in the South China Sea, 55 male soldiers, 26.35 ± 3.98 years old, underwent a limited health screening in the outpatient department of a second class hospital on an island and reef in Nansha, China. The data of oral examinations were collected.

Methods

The information including age, sex, dentition, visible problems of periodontium, mucosa, and habits such as smoking, carbonated drinks, chewing betel nuts, were collected. Dental calculus is divided into mild (+), moderate (++) and severe (++); gingivitis, periodontitis and pericoronitis are diagnosed as periodontal inflammation, which can be divided into mild, moderate and severe according to clinical manifestations. Abnormal eruption and caries of wisdom teeth were only recorded with or without. The diagnosis of OSF is determined by oral visual examination, and divided into positive (+) and negative (-). Smoking was recorded as the number of cigarettes per day × years. The complain of chewing betel nuts and drinking carbonated drinks were measured as one piece of betel nut or one bottle of carbonated drink a day at least [2].

Data analysis

The incidence of disease spectrum was described by counting method. Pearson correlation analysis was used to explore the correlation of measurement data. Smoking is divided into less than 10 years and more than 10 years. Chewing betel nut and drinking carbonated drinks more than one per-day are defined as habitual, less than one per-day as non-habitual. The incidence of OSF in different habitual persons is compared by *chi-square* test [3].

e-ISSN: 2320-7949
p-ISSN: 2322-0090

RESULTS

The ranking of oral diseases is shown in Table 1. Dental calculus, abnormal eruption of wisdom teeth and periodontal inflammation are the most common oral problems. Of the 20 patients with periodontitis, 18 were accompanied by dental calculus, and there was a significant correlation between the two (r=0.465, p=0.000). At the same time, dental calculus was also negatively correlated with the chewing betel nut (r=-0.276, p=0.041) and positively correlated with the measurement size of drinking habits (r=0.277, p=0.041).

Table 1. Summary of oral problems.

S. no	Oral problom	cases	%
1	Dental calculus	37（mild 25，moderate 11，severe 1）	67.27%
2	Abnormal eruption of wisdom teeth	26	47.27%
3	Periodontitis	20（mild 18，moderate 2）	36.36%
4	dental caries	10	18.18%
5	OSF	7	12.73%
6	Dentition defect	4	7.27%
7	Dentition crowding	3	5.45%

There were 7 cases of OSF in this cohort. Most of them are early and middle stage lesions. The lesions are located in the buccal oral wall of the occlusal site. The buccal mucosa of the mouth becomes white, slightly opaque, hard on palpation. And fibrous strips can be found (Figure 1).

Figure 1. Presentation of cases with OSF.

Comparison of OSF in different living habits was showed in Table 2. All patients with OSF have the habit of chewing betel nut, at least more than 1 capsule per day. Between them, only one person had no smoking history, and the rest had a smoking history of more than 10 years [4]. *Chi-square* test found that the oral submucous fibrosis of the group who smoked more than 10 years and chewed betel nuts habitually was significantly higher than that of the group who smoked less than 10 years, and only occasionally or not chewing betel nuts (p=0.000). All patients with mucosal fibrosis complained that they did not drink carbonated drinks at ordinary times, and there was a significant difference in *chi-square* test (p=0.002).

e-ISSN: 2320-7949
p-ISSN: 2322-0090

Table 2. Comparison of OSF in different living habits.

		OSF		*Chi-square*	Sig.
		(-)	(+)		
Smoking	＜1 cigarette*10 year	31	1		
	≥ 1 cigarette*10 year	17	6	38.6	0
Betel-nut Chewing	＜1 piece/d	37	2		
	≥ 1 piece/d	11	5	55.473	0
Carbonated drinking	＜1 bottle/d	20	7		
	≥ 1 bottle/d	28	0	12.55	0.002

DISCUSSION

The working and living habits of reef residents are also different from those of the mainland, because of the natural environment characteristics of reef, such as high temperature, high humidity, high salt, as well as the restriction of living supply conditions. It is especially difficult for the health service and fresh water supply [5]. Because oral problems generally are not life-threatening, their response measures will not be prioritized by the logistics support, even those problems get aggravation into diseases [6]. The previous literature data of oral disease epidemic survey on the reef showed that the top three oral diseases were abnormal eruption of wisdom teeth (23.0%), dental calculus (11.8%) and dental caries (8.4%). Our results were similar distribution. it indicates that the basic aspects of dental diseases have not changed. The general survey of inland population showed that the caries rate was 22.4%, and the incidence rate of gingivitis was 59.2%. The caries, various kinds of inflammation around teeth (such as pulpitis, chronic periodontitis, etc.), dentition defect and impacted teeth ranked first in the data from inland hospitals [7]. According to the literature, the periodontitis and caries rates of people under 30 years old are significantly lower than those of people over 30 years old. The cases in this article are about 26 years old and belongs to the low incidence group. Our results showed higher incidence. In the cases of medical treatment, the correlation between dental calculus and inflammation around the teeth still reflects the deficiency of oral health habits. It is necessary to continuously strengthen the oral health knowledge propaganda of this group [8].

There were 7 cases of OSF among the 55 patients (12.73%). The main cause of OSF is smoking and chewing betel nut. there were significant differences between those who had chewing betel nut and those who smoked habit in this cohort. OSF is a high incidence among people who habitually chew betel nut. Its pathological morphology is mainly manifested by the degeneration of fibrous tissue and epithelial atrophy in the lamina propria of the buccal mucosa, resulting in the hardening of the mucosa, the formation of cords, and finally the closing of the jaw, which hinders the development of various oral functions, and can develop into a precancerous state. The general observation results of the cases described in this paper reflect such a process of disease progression [9].

Interestingly, in the case of this article, OSF has a significant difference in whether there is a habit of drinking carbonated drinks. In particular, 7 patients with OSF had no habit of drinking carbonated drinks. In other words, people who drink carbonated drinks regularly (defined in this article as at least one bottle per day on average) have no OSF, even if they are used to smoking and chewing betel nuts. At the same time, 14 people have the habit of smoking (>10 years) and drinking carbonated drinks, 8 people have the habit of chewing betel nut and drinking carbonated drinks, and 7 people have the habit of both. None of these patients developed OSF. This may be due to the accidental phenomenon of small sample size.

e-ISSN: 2320-7949
p-ISSN: 2322-0090

However, some studies support that carbonated beverages can delay the proliferation of fibroblasts in the connective tissue of oral mucosa, resulting in delayed healing of oral wounds [10]. The optimal pH value for the viability and activity of fibroblasts is 7.2–7.5, and the pH value produced by carbonated drinks is lower than 3.0, which is not conducive to the proliferation of fibroblasts. Some scholars believe that chewing areca is because are coline enters the submucosa through the small wound of oral mucosa caused by the coarse fiber of areca, resulting in the formation of submucosal fibrous tissue. Some studies have shown that areca nut extract can increase the number of mast cells in the buccal submucosa of animals, and then increase the number of fibroblasts, thus promoting the development of oral submucosa fibrosis. The effects of are coline and other OSF injuries and carbonated beverages may have antagonistic effects on the proliferation of submucosal fibroblasts and the formation of connective tissue. However, given the limited sample size in this paper, this correlation may be accidental. However, this contingency is logically possible and deserves further investigation and experimental research.

CONCLUSION

The residents in tropical reefs are needed to pay more attention on the oral health conditions. Carbonated drinks may neutralize and alleviate the damage of betel nut alkaloids or nicotine to OSF.

Clinical relevance for the first time, it was observed that carbonated drinks might prevent the occurrence of OSF in betel nut chewing and smokers, although its certainty and potential mechanism need to be clarified and explored

LIMITATIONS

The number of cases included in this study is not large, and the conclusions obtained from the analysis are somewhat accidental, particular the phenomenon of carbonated drinks antagonizing the OSF incidence rate of chewing betel nuts. This paper only provides a possibility and research direction based on the existing data. Although some physiological basis has been found, its certainty and potential mechanism need to be clarified and explored by further experimental research or large sample clinical research.

ACKNOWLEDGEMENT

The authors gratefully acknowledge the support of the department of stomatology of the reef hospital.

AUTHOR CONTRIBUTION

XQ: Investigation, Visualization, Writing & editing–original draft, RY: Validation, Analysis, Writing–review & editing.

FUNDING

Open access funding provided by Naval Medical center of PLA.

DATA AVAILABILITY

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

e-ISSN: 2320-7949
p-ISSN: 2322-0090

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study protocol was approved by the Biomedicine of Naval Medical Center of PLA (No. AF-HEC-031) and were in accordance with the Helsinki Declaration as well as national and institutional guidelines. The need for informed consent was waived by ethics committee of Naval Medical Center of PLA because this retrospective study did not intervene with the participate and the data did not involve personal privacy.

CONSENT FOR PUBLICATION

Not applicable.

COMPETING INTERESTS

The authors declare that they have no competing interests.

REFERENCES

1. Qin Yinyi, et al. Investigation on the characteristics of oral diseases among officers and soldiers stationed on islands and reefs. J Med Assoc Thai. 2021;64:1204-1207.
2. Angadi PV, et al. Areca nut in pathogenesis of oral submucous fibrosis: revisited. Oral Maxillofac Surg. 2011;15:1–9.
3. Liu Yao, et al. The current situation and countermeasures of the development of oral health service in the Navy. J Navy Med. 2010;31:118-120.
4. Guo Jing, et al. Changes and development of the current oral health status of our military active personnel. J Dent Periodontol. 2012;22:533-536.
5. Zhou Zichong, et al. The big data of disease distribution in oral clinics and its guiding value for medical resource allocation. Chin J Med Libr Inf. 2016;25:22-26.
6. Wollina U, et al. Oral submucous fibrosis: an update. Clin Cosmet Investig Dermatol. 2015;13:193-204.
7. Passi D, et al. Oral submucous fibrosis: Newer proposed classification with critical updates in pathogenesis and management strategies. Natl J Maxillofac Surg. 2017;8:89-94.
8. Tilakaratne WM, et al. Oral submucous fibrosis: review on aetiology and pathogenesis. Oral Oncol. 2006;42:561-568.
9. Ayesha F, et al. Effect of carbonated drinks on wound healing of oral epithelium. J Oral Biol Craniofac Res. 2016;6: 49–53.
10. Xie Di, et al. Expression of MC and MCT in oral submucous fibrosis and its coexisting oral lichen planus. Zhongnan University of China. 2012.