



ORIGINAL ARTICLE

Relationship between areca nut chewing and periodontal status of people in a typical aboriginal community in Southern Taiwan



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Abstract *Background/purpose:* Although the clinical impact of areca nut chewing on periodontal status had been reported, the results of epidemiological studies on areca nut or betel quid chewing did not show the same influence on periodontitis. This study assessed the influence of variables such as areca nut chewing, sociodemographic variables, lifestyle, and oral hygiene behavior on the periodontal status of people in a typical aboriginal community in Southern Taiwan.

Materials and methods: A survey was conducted on an aboriginal community in Taiwan, because nonsmoking chewers are rare in cities. In total, 114 aboriginal residents, 30–60 years old, were recruited for this study. Clinical measurements included bleeding on probing, pocket depth, clinical attachment loss (CAL), and tooth loss. Adjusted means were estimated by least-squares means. Multiple regression analysis was used to assess the relationship between potential risk factors and CAL.

Results: Age- and sex-adjusted means showed that the CAL of chewers was significantly higher than that of the control group. The chewing of more than 33,000 pieces of areca nut resulted in significant CAL. Multiple regression showed that areca nut chewing led to 0.16 mm ($P = 0.0298$) total CAL for every thousand pieces, and plaque index was a significantly strong contributing factor.

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Conclusion: The results indicated that areca nut chewing might significantly enhance CAL in the population. Improved oral hygiene, fewer additives, and reduced use of areca nut would significantly reduce CAL, which should be encouraged for chewers.

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Introduction

Areca nut is used by approximately 600 million people worldwide, and chewers not only reside in Asia, but also found in Asian immigrant communities in Europe.^{1–3} More chewers live in the United States as a result of increased immigration from South Asia,⁴ and dental professionals will increasingly encounter areca nut chewers in the near future.

The clinical impact of areca nut chewing on periodontal status has been reported, but there is an absence of strong evidence due to the complexity of related factors. Although *in vitro* studies have shown that areca extracts increase gingival inflammation,^{5,6} inhibit immune reactions,^{7–9} affect osteoblasts,¹⁰ and may be cytotoxic to periodontal fibroblasts,¹¹ only a few people chew pure areca nut without any additives. The results of epidemiological studies of areca/betel quid do not show the same significant influence on periodontitis. Several epidemiological studies have revealed a higher prevalence of periodontal disease among areca/betel quid chewers.^{12–14} However, longitudinal studies reported that areca/betel nut chewing had a protective effect on clinical attachment loss (CAL)¹⁵ and tooth loss (TL),¹⁶ while cross-sectional studies indicated that areca/betel nut chewing was related to TL.^{17,18} In India, almost all men chewing areca nuts also use tobacco.¹⁹ In Taiwan, while areca nut has never contained any tobacco, 90% of areca nut chewers were reported to be cigarette smokers.^{20,21} Hence, it has been difficult to exclude the usage of tobacco or cigarettes as a risk factor. Further, chewers are likely to be less-well-educated people and blue-collar workers,²² with poorly controlled oral hygiene. There are so many confounding variables that it is

difficult to clarify the effects of areca nut chewing on periodontal status.

In hospital-based studies about the association of areca nut chewing with periodontitis, detailed information on full-mouth pocket depth (PD), CAL, and the diagnosis of chronic periodontitis^{13,23,24} can be obtained, and community-based cross-sectional survey studies have provided data on the prevalence and average use in the population.¹⁴ Aboriginal communities of Taiwan provide a good opportunity for identifying the periodontal destructive effects of areca nut chewing under fewer confounding variables. The number of people who admit to areca/betel quid chewing, but without any cigarette smoking habits, is relatively higher, and thus a community-based study can be conducted in a public health station, such as in a hospital. Accordingly, the present investigation, based on the characteristics of the aboriginal community, was designed to explore the relationship between areca nut chewing and periodontal status. The level of consumption of areca nut and the quantity of additives were also investigated.

Materials and methods

Ethics and informed consent

Prior to the initiation of the study, ethics approval was obtained from the human experiment and ethics committee of Kaohsiung Medical University. The purpose of the investigation was fully explained. All participants gave written informed consent prior to participation and were advised to seek treatment if any pathological condition was diagnosed.

Table 1 Sample size and mean age.

	Mean age (y)						Cumulative amount (K pieces)	
	Total		Male		Female		Areca/betel quid chewing	Cigarette smoking
	N	Mean ± SD	N (%)	Mean ± SD	N (%)	Mean ± SD	Mean ± SD	
Smoker and chewer	39	42.8 ± 6.0 ^{a,b}	33 (84.6)	42.7 ± 6.2 ^{a,b}	6 (15.4)	44.0 ± 4.5	126.1 ± 114.0	191.7 ± 212.0
Chewer alone	39	45.1 ± 5.9	8 (20.5)	49.1 ± 5.7	31 (79.5)	44.1 ± 5.5	78.4 ± 77.7	
Control group	36	41.7 ± 5.9	11 (30.6)	41.8 ± 6.4	25 (69.4)	41.6 ± 5.8		
Total	114	43.3 ± 6.0	52 (45.7)	43.5 ± 6.5	62 (54.4)	43.1 ± 5.6		

SD = standard deviation.

^a Testing equivalence among groups, $P < 0.05$.

^b Significant pair between chewer and control groups.

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