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The Relationship between Betel-Chewing and Dental Caries: Case Study on Papuan College Students in Makassar City

A. Rizki Amelia[1], Andi Surahman Batara[1], Aulya Maysitha Syahputri Arif[1]

[1]Department of Public Health, Universitas Muslim Indonesia, City of Makassar, Indonesia

Corresponding Author: A. Rizki Amelia

ABSTRACT

Caries is a universal disease that can happen to anyone, any age, races, and places all over the world. Several efforts to resolve this health problem have not to result in any significance. Betel-chewing habits may affect the condition of teeth, gingiva, and oral mucosa. The purpose of this study was to determine the relationship between betel-chewing habits on the incidence of dental caries in the Papuan college students in Makassar city. The study was analytic research with a cross-sectional design. The population in this research was the Papuan college students studying in Makassar city. This study used a sample of the total population was about 54 respondents. The data collection on primary and secondary data was conducted by direct examination and interview using a questionnaire. Data were analyzed using chi-square at the level of 95% (α=0.05). The relationship between betel-chewing habits and the incidence of dental caries in Papuan college students in Makassar City according to the period of chewing was with the Pearson Chi-Square test obtained by value p = 0.001 ($p<0.05$), means there was a significant relationship. The frequency of betel-chewing gained significance p = 0.000 ($p<0.05$) and the composition of betel-chewing gained significance p= 0.000 ($p<0.05$). The three variables from this habit showed a significant association with the incidence of dental caries. There is a relationship between betel-chewing habits against the incidence of dental caries on Papuan college students in Makassar city.

Keywords: Betel-chewing habits, Dental caries, Papuan College Students.

INTRODUCTION

One of the cultural factors found in society especially the Papuans in Indonesia is the habit of betel-chewing. Betel is the process of concocting a mixture of several ingredients such as betel, areca nut, and lime, which are then chewed together [1]. Betel-chewing behavior in Indonesia, especially in the Papuan community, has been carried out since the Melanesians take a step on around the Pacific region. Chewing the betel is also done by several people from educational backgrounds [2]. The positive effect of betel-chewing is to inhibit the process of caries formation, while the negative impact of betel-chewing on teeth and gingiva can cause stein, besides it can cause periodontal disease, lesions on the oral mucosa, bad oral hygiene, and can cause atrophy of the tongue mucosa[3].

The aim of study was to identify the relationship between the habit of betel-chewing with dental caries on Papuan students.

MATERIALS & METHODS

The type of research was an observational study with a cross-sectional design. The research was conducted in Makassar City, particularly in Biak and Serui dormitories. This research was conducted in April - June 2020. This study has received a recommendation from the research ethics commission of the Faculty of Public Health, Indonesian Muslim University.

The sample was chosen based on the inclusion criteria, such as 1) Papuan native respondents, 2) Respondents who have teeth, 3) Respondents who are still active betel-chewing, 4) Respondents are categorized as permanent teeth, 5) Respondents who are willing to be used as research samples with informed consent. The population in this study was all Papuan students who did the betel-chewing in the Biak dormitory and the Serui dormitory, with a total population of 54 persons. This study did not use a sample sampling, but a total population. The tools and materials used in the observation were: Diagnostic sets (sonde, windshield, excavator, and tweezers), well-known nier beken, cotton, 70% alcohol, status cards, and sheets of observation and interviews. The data obtained were analyzed by univariate and bivariate statistics, namely by chi-square at 95% confidence level ($\alpha = 0.05$) using SPSS.

RESULT

Table 1 show that respondents included 29 male respondents (53.7%) and 25 female respondents (46.3%) and respondents who lived in the Serui dormitory was 25 persons (46.3%), and the Biak dormitory was 29 persons (53.7%).

Table 1: Characteristics of the respondent

Characteristics	N (54)	%
Sex		
Male	29	**53.7**
Female	25	**46.3**
Dormitories		
Serui Dormitory	25	**46.3**
Biak Dormitory	**29**	**53.7**

Table 2: Distribution of dental caries incidents according to the

Dental Caries	n (54)	%
Period of betel-chewing		
>10 year	21	38.9
6-10 years	17	31.5
1-5 years	16	29.6
The betel-chewing frequencies		
>5 time/day	18	33.3
4-5 time/day	20	37.0
1-3 time/day	16	29.6
Betel compositions		
Lime, areca nut, betel, gambier, tobacco	16	29.6
Lime, areca nut, betel, gambier	19	35.2
Lime, areca nut, betel	19	35.2
Dental caries		
Severe	21	38.9
Moderate	17	31.5
Mild	16	29.6

Table 2 show that the habit of betel-chewing with dental caries in Papuan students in Makassar, more respondents had a long period of betel chewing >10 years was about 21 persons (38.9%), respondents did the chewing with a frequency of 4-5 times/day was about 20 persons (37.0%), respondents did the betel-chewing with the composition of lime, areca nut, betel, and gambier was about 19 persons (35.2%), and respondents found with severe dental caries were about 21 persons (38.9%).

Table 3: Bivariate analysis of betel chewing period. Frequencies, composition, and dental caries incidents

Betel chewing period. Frequencies, composition		Dental caries			P
		Severe carie(18)	Moderate caries (19)	Mild caries (17)	
		n (%)	n (%)	n (%)	
Chewing periods	>10 years (21)	12 (22.2)	6 (11.1)	3 (5.6)	0.01
	6-10 years (17)	3 (5.6)	9 (16.7)	5 (9.3)	
	1-5 years (16)	3 (5.6)	4 (7.4)	9 (16.7)	
Frequencies	>5 time/day	13 (24.1)	4 (7.4)	1 (1.9)	0.00
	4-5 time/day	4 (7.3)	12 (22.2)	4 (7.4)	
	1-3 time/day	1 (1.9)	3 (5.6)	12 (22.2)	
Composition	Lime, Areca nut, Betel, Gambier, Tobacco (16)	13 (24.1)	2 (3.7)	1 (1.9)	0.00
	Lime, Areca nut, Betel, Gambier (19)	4 (7.4)	12 (22.2)	3 (5.6)	
	Lime, Areca nut, Betel (19)	1 (1.9)	5 (9.3)	13 (24.1)	

Table 3 show that dental caries incidence in Papuan students who had the betel-chewing habit in Makassar, there were more severe caries cases with >10 years of betel-chewing, was about 12 persons (22.2%) respondents and it was a relationship between the length of betel-chewing and the incidence of dental caries

on Papuan students (p = 0.01), then a betel chewing frequency >5 times/day were 13 (24.1%) respondents and there was a relationship between the frequency of betel-chewing and the incidence of dental caries in Papuan students (p = 0.00). The more severe caries cases with the composition of areca nut, betel, lime, gambier, and tobacco were about 13 (24.1%) respondents and there was a relationship between the composition of the betel with the incidence of dental caries in Papuan students with the betel-chewing habit in Makassar City (p = 0.00)

DISCUSSION

The results of the study on the relationship between the betel-chewing habit against the incidence of dental caries according to the habit length periods showed that the longer the period of betel-chewing, the more dental caries owned. It can be seen from the results, that for respondents who have been betel-chewing for more than ten years, there were 21 persons with severe caries (22.2%). It means that the average Papuan student who has had the habit of betel-chewing for more than ten years has suffered severe caries. The results of the bivariate analysis obtained a value of p = 0.01 (p <0.05), so there was a significant relationship between the period of betel chewing and the incidence of dental caries.

Likewise, the results of research based on the frequency of betel-chewing with dental caries were found that the more frequent betel-chewing in one day (more than five times a day) was about 13 persons with severe caries category. While the respondents who did the betel-chewing 1-3 times a day, there were 12 persons with mild caries category. The results of the bivariate analysis on the correlation between the frequency of betel-chewing and the incidence of dental caries P = 0.00 (P <0.05) shows that there was a significant relationship between the frequency of betel-chewing and the incidence of dental caries. The length of the betel-chewing measured based on the period of the respondent in making the habit, calculated from the first time the respondent has been betel-chewing (years). The results of the study found that most respondents who had the habit of betel-chewing > 10 years were 21 persons (38.9%). The results of the interview found that initially, the respondents only wanted to try, but over time it caused a sense of dependency (addiction).

According to Papke et al (2015), addiction is a reason most of the betel-chewing person continues the habit of chewing because the areca nut contains arecoline, which causes a sense of dependency (addiction) [4]. Betel-chewing is considered an important practice to maintain teeth while the teeth are still there [5]. This might be because the respondent is a community belonging to the middle age group or might be caused by differences in the age distribution of the group under study. Betel-chewing is also conducted by some people from elementary schools to tertiary institutions [6]. The habit of betel-chewing is inseparable from the beliefs of people. People believe that chewing areca nut can provide pleasure such as smoking [7], as an activity in leisure time [8], can eliminate the breath odor [9], chewing betel from generations to generations[10], and some believe it can strengthen teeth [11].

Long-term habit of forming a betel behavior has an impact on the condition of teeth and oral health [12]. The results of research in Thailand showed an excessive chewing burden and exposure to various components of betel contribute to various oral and dental problems, including dental caries, periodontal tissue, oral cancer, and oral soft tissue lesions.

The chewing burden on the betel-chewing habit is indicated by the pattern and practice on the Papuan community, which has different chewing habits than the rest of the archipelago [1]. Those can be seen on directly chewing areca nut into the mouth, which is different from the practices of other communities in the archipelago, which are wrapped by betel leaves before

chewing. Indigenous Papuans engage in betel behavior because of the inheritance of their ancestors [1]. The results of the study found that patients affected by oral cavity cancer do the betel-chewing frequency that is more than ten times a day, along with not paying attention to oral hygiene status and teeth [13].

The composition of betel consists of lime, areca nut, betel, gambier, and tobacco [14]. Clinically testing has been carried out, such as the content of lime in betel ingredients has an adverse impact on oral health and teeth. The content of betel leaf is proven to be able to inhibit the bacteria that cause dental caries. But another study suggesting long-term use of betel has an impact and a higher risk of oral submucosal fibrosis[15] and gambier extract may inhibit the growth of *Streptococcus mutans (S. mutans)* which causes of dental caries, but the study results prove the gambier content has no anticaries effect [16], chewing tobacco leaves has the same impact as nicotine in cigarettes [17]. The effect of differences in the length of betel-chewing on oral health on some people may differ depending on the frequency and awareness of cleaning the teeth and mouth area [5].

All Papuans ethnicities know the habit of chewing betel. Betel-chewing habit is no different from other pleasurable practices, such as tobacco, tea, and coffee, so people are challenging to get rid of the habit. Chewing betel has a positive effect because the ingredients used contain antiseptics that can strengthen teeth [18]. The other research revealed that chewing betel could reduce the danger of dental caries and maintain oral health. It occurred because the betel leaf has antioxidant activity[19]. This habit has long been carried out by women and men, both young and old. This habit then continues into pleasure that is difficult to stop[20]. The practice of chewing betel on the people of Papua has become a culture that does not pay attention to age, race, rank, and class [21].

This habit becomes deeply rooted in the community, so it is expected to strengthen the kinship in the daily life of the Papuan people. Each tribe in the Papua ethnic has a quite varied composition of betel chewing, such a pinang (*Areca catechu L*), betel *(Piper betle L)*, gambier (*Uncaria gambir roxburgh*), lime, and tobacco. The most commonly used from betel plants are fruits, roots, stems, and leaves. The part of the areca nut that is used is young fruit. Betel leaf contains essential oils in which the main component consists of phenols and their derivative compounds such as chavicol, cevibetol, carvacrol, betehlphenol, eugenol, and allilpyrocatechol. Besides essential oils, betel leaf also contains carotene compounds, thiamine, riboflavin, nicotinic acid, vitamin C, tannin, sugar, starch, and amino acids [22].

CONCLUSION

Following the finding on the relationship between the betel-chewing habit with the incidence of dental caries on Papuan students in Makassar, it can be concluded that there was a relationship between that habit against the dental caries cases on Papuan students in Makassar. The betel-chewing practice based on the period, frequency and betel composition showed significant results ($p < 0.05$).

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