

Tuak Legen (Traditional Palm Wine) Consumption Habits and Severity of Dental Caries in Indonesia

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Abstract

Aims and Objectives: To determine the severity of dental caries according to the behavior of drinking traditional Tuak legen/palm wine. **Materials and Methods:** A descriptive study with cross-sectional design was conducted in a population of Gedongombo villagers with the habit of consuming traditional Tuak legen/palm wine for at least 1 year. The participants in this study were men aged 20–60 years comprising 50 participants. Variables observed in this study were dental caries and the habit of consuming palm wine. Caries level was measured using the decayed-missing-filled teeth (DMF-T) index. The data regarding palm wine consumption habits were obtained from self-administered questionnaire filled by the respondents. Chi-square test was carried out using the Statistical Package for the Social Sciences (SPSS) 17.0 software to analyze the data. **Results:** Respondents who have the habit of consuming palm wine with the frequency 2–3 times a week have higher DMF-T score (7.45) compared to respondents who consumed palm wine only once a week (5.0). We also found that respondents who consumed palm wine by slowly drinking had a higher DMF-T score (7.27) compared with respondents who consumed Tuak legen straightened up at once (5.75). **Conclusion:** Respondents with the habit of consuming traditional palm wine have higher DMF-T score.

Keywords: Alcohol, Caries, Decayed-Missing-Filled Teeth, Drinking Habit of Palm Wine

INTRODUCTION

Dental caries is a widespread disease throughout the world, where the disease cannot heal by itself. It is present throughout the world regardless of age, nation, or economy. According to the research in European, American, and Asian countries, including Indonesia, 80%–95% of the populations have dental caries.^[1]

Caries is a disease formed due to increased carbohydrate fermentation that left in the mouth, which is marked by the damage to the dental tissue, including enamel, dentin, and cementum.^[2] The occurrence of dental caries is influenced by several factors in the mouth that interact with each other, namely microorganisms, carbohydrates, tooth surfaces, and time.^[2]

A lot of food and drinks contain sugars that can cause caries. One of the famous traditional beverages in Indonesia is Tuak. Tuak is a kind of beverage from the fermentation of fruit, named siwalan fruit. Tuak is often also called arak, which is a product containing alcohol.

Palm wine is formed from glucose (10.93 g/100 cc) contained in siwalan water.^[3]

Carbohydrates, sugars, and acids contained in the Tuak are indirectly interconnected and produce acids that can cause enamel demineralization. On the contrary, alcohol in palm wine has an inhibitor effect on cariogenic flora to prevent caries, although there is still a possibility for caries.^[4]

In addition to its content that can cause caries, Tuak is a drink that has a strong attachment to the tooth surface. The longer the cariogenic substance is attached to the tooth surface, the easier it is to form plaque that causes caries.^[5]

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In East Java, palm wine is found in Tuban Regency, Semanding Subdistrict, especially in Gedongombo Village. This is a region whose residents are included in the consumption of Tuak because of its location, which is a suburb of Tuban and there are many sellers of palm wine. Tuak comes from liquid coming out of certain palm trees. In this area, Tuak comes from cycads.^[6]

Tuak formation is optimal at pH 4.0–4.5 and is well-formed in an aerobic atmosphere, but fermentative wine can be formed in an anaerobic atmosphere. The optimal sugar content for Tuak formation is 10%, but the optimal sugar content for the start of fermentation is 16%.^[7] Tuak contains alcohol, carbohydrates, sugar, and acids. Carbohydrates provide substrates for the manufacture of acids for bacteria and synthesis of extracellular polysaccharides.^[8]

In the oral cavity, there are enzymes such as amylase, which can convert polysaccharides to glucose and maltose. The glucose is converted by bacteria in the oral cavity, such as lactobacillus, into lactic acid and milk acid. A low pH of milk acid (pH 5.5) will damage the inorganic ingredients from the enamel and eventually form dental caries.^[1]

Communities consuming palm wine in the Tuban Region usually consist of parents; the majority of them are farmers, pedicab drivers, or other traditional societies. People in that area had a perception that Tuak is not a harmful drink, either for personal health or oral and dental health. In the preliminary survey, we conducted on 30 villagers of Gedongombo Village, Semanding Subdistrict, Tuban District, it was found that 28 people (93%) had dental caries. The purpose of this study was to determine the severity of dental caries according to the drinking habit of the residents of Gedongombo Village. This study could provide information about the effect of palm wine consumption habits on the severity of dental caries, which will be very useful for dental health workers in providing education to the community.

MATERIALS AND METHODS

This was a descriptive study with cross-sectional design. All the respondents in this study who had filled the informed consent form stated their willingness for intraoral examination and filling questionnaire. Ethical approval for performing this study had been obtained from the Research Ethics Committee of Faculty of Dental Medicine, Universitas Airlangga. Ethical certificate number for this study was Ref no. 59/KKEPK.FKG/VI/2015. This research was approved by the head of public health center in Gedongombo Village, Semanding Subdistrict, Tuban Regency, East Java Province, This research was approved by the head of public health center and the regent of Gedongombo Village, Semanding Subdistrict, Tuban regency, East java Province.

The sampling method used in this study was simple random sampling. The sample size was calculated based on the preliminary research, and then the minimum samples obtained for this study were 20 participants. The participants in this study were men aged 20–60 years with the habit of consuming traditional Tuak legen/palm wine for at least 1 year. We collected 50 participants, which had exceeded the minimum sample size required. Variables observed in this study were dental caries and the habit of consuming palm wine. The data regarding palm wine consumption habits were obtained from self-administered questionnaire that was filled by the respondents. Caries level was measured using the decayed-missing-filled teeth (DMF-T) index. The severity of dental caries was measured using the DMF-T index. The score was obtained by calculating total decay (all of the teeth were hollow or damaged by caries), missing (all missing teeth or indication for extraction due to caries), filling (the entire filled tooth) from each respondent then dividing by the number of samples. The habit of drinking palm wine was obtained using the questionnaire that was filled by the respondents. The questionnaire contained three questions about the habits of consuming palm wine with the following details: amount of palm wine consumed each glass in a day, how to drink Tuak (drink it all at once in a time or drink it slowly), and the time chosen for drinking Tuak (morning, afternoon, or evening). The data analysis in this study was conducted using the Statistical Package for the Social Sciences (SPSS) software for Windows, version 17.0. (SPSS, Chicago, Illinois), with a 95% of confidence interval and $P < 0.05$.

RESULTS

Results were presented with respondents' distributions data by the type of work, educational background, frequency of toothbrushing in a day, behavior to overcome dental and oral disease, time when consuming palm wine, and the way they drink the palm wine [Table 1].

As per Table 2, the highest severity of the research participants who drank palm wine had a job as a factory worker, that is, 54%, with DMF-T score >6 . In the educational background, the participants with the background of primary school education (30 participants) had high caries severity with score >6 , that is, as many as 25 people. A total of 56% of participants (28 participants) had a habit of toothbrushing once a day, and 25 of them had caries severity with a score of >6 .

Table 3 showed that 66% of respondents that consumed Tuak in the afternoon had DMF-T score higher than who drank Tuak during the day. From a total of 33 participants who drank Tuak in the afternoon, 21 participants had DMF-T score >6 . For the amount of Tuak taken per day, 56% of the participants consumed 2–3 times or more and had a high DMF-T compared with the participants that

Table 1: Frequency distribution table

Variables		Frequency (n)	Percentage (%)
Occupation	Factory worker	27	54
	Merchant	15	30
	Driver	8	16
Education background	Elementary school graduate	30	60
	Junior high school graduate	20	40
Frequency of toothbrushing	Once a day or less	28	56
	Twice a day	22	44
Behavior to overcome problems of dental and oral diseases	Self-treatment	9	18
	Seek a treatment in public health center	16	32
	Ignore it (did not provide any treatment)	25	50
Time of drinking	Daytime	17	34
	Afternoon	33	66
Frequency of drinking palm wine in a day	Once	22	44
	2–3 or more	28	56
The way of drinking	Straightened up	28	56
	Drinking slowly	22	44

Table 2: Distribution of caries severity

Distribution of caries severity	Frequency	%	Caries severity ^a	
			1–5	≥ 6
On the basis of occupation				
Factory workers	27	54	8	19
Merchants	15	30	5	10
Drivers	8	16	5	3
On the basis of education				
Elementary school	30	60	5	25
Junior high school	20	40	13	7
On the basis of frequency of toothbrushing in a day				
Once/never	28	50	3	25
Twice	22	44	15	7

^aMeasured using the DMF-T index

Table 3: Distribution of caries severity based on the habit of drinking Tuak

	Freq.	%	Components				Caries severity		P value	r value
			D	M	F	DMF-T	1–5	≥ 6		
Time of drinking										
Daytime	17	34	3.94	0.76	1.41	6.12	6	11	1.0	0.941
Afternoon	33	66	4.24	1.82	0.52	6.58	12	21		
Frequency of drinking in a day										
Once	22	44	3.32	0.45	1.23	5	14	8	0.001	0.000
2–3 or more	28	56	6.815	2.81	0.985	7.45	4	24		
The way of drinking										
Straightened up	28	56	3.68	0.86	1.21	5.75	11	17	0.803	0.585
Drinking slowly	22	44	4.77	2.18	0.37	7.27	7	15		

DMF-T = Decay, missing, or filling of permanent tooth

drank only one glass of Tuak a day. From a total of 28 participants who drank Tuak straightened up all at once, 24 participants had DMF-T score >6. On the basis of habit of drinking Tuak, participants who drank Tuak slowly had a high DMF-T score (7.27), that is, 44% of the participants or 22 participants, from those 22 participants, 15 participants had caries severity score >6.

The result obtained from caries severity examination using DMF-T index, with the number of 50 participants, was 6.42.

DISCUSSION

In this study, it is known that 60% of participants with primary school education background had higher DMF-T score than those with educational background at the level of junior high school.

The level of education can affect a person's behavior in maintaining their oral and mouth problems. Likewise with the frequency of toothbrushing per day, 56% of the participants only brushed once per day with higher DMF-T values.

A significant difference was observed between the frequencies of toothbrushing. The rarer the frequency of toothbrushing, the more debris and residual Tuak will gather together and form plaque and lead to dental caries.^[9]

Fifty-six percentage of participants consuming 2–3 glasses or more Tuak per day had higher DMF-T score than the participants consuming only one glass of Tuak per day. This suggests that the more a person consumes Tuak, the higher the severity of the caries.

However, a DMF-T score of 5 indicates that the severity of the caries in the population is high. The results of this study differed from the opinion that the alcohols contained in the palm wine have an inhibitor effect on cariogenic flora in the oral cavity, thus preventing dental caries. However, the formation of caries is also strongly influenced by other substance in Tuak, such as the carbohydrates, acids, and glucose.^[3]

Fifty-six percentage of participants that consume Tuak in straightened up way had higher DMF-T score when compared with those who drink Tuak slowly. However, the decay (D) value of the samples that consumed Tuak was gradually higher at 4.77. This shows that consuming Tuak by slowly drinking aggravated caries. Food or beverages in liquid form have a stronger attachment to the tooth surface than a solid form.^[5] If Tuak was drunk slowly, more part of the palm wine attached to the surface of the tooth than if drunk straightened up, although the results of statistical analysis show that there is no significant difference between drunk slowly and straightened up.^[5]

Table 2 showed no significant difference in caries severity between drinking Tuak time during the day and during afternoon. DMF-T value for daytime Tuak drink was 6.12 and for afternoon Tuak drink was 6.58. Although no significant difference was observed, the severity of the caries was quite high. Judging from the value of D, participants who drank Tuak in the afternoon had a higher value of 4.24 compared to those who drank during daytime at 3.94. This can be caused by the consumption of other food during the day, which helps in the mechanical cleaning process so that the remaining Tuak attached to the tooth surface can be reduced. Although in the afternoon after drinking Tuak, the participants were lazy to brush teeth, reinforced with 56% participants data who only brushed teeth once a day or not at all, so that can aggravate the caries level.^[10-13]

From the result of study, we can provide knowledge about the effects of Tuak drinking habits on dental health so that Tuak drinkers in Indonesia could be more aware to their oral health conditions caused by their habit of consuming palm wine. This study looked at the caries level of a palm wine drinkers in the age group of 20–40 years in Indonesia. The results were very positive; however, because we only looked at Indonesian participants at certain age range, these findings may not translate to participants of other ethnicities or participants with some ethnicities in other age group.

From this study, we can conclude that the habit of drinking traditional palm wine can lead to dental caries. People who had consumed 2–3 glasses or more palm wine per day had higher DMF-T score than those who had consumed only

one glass of palm wine per day. This suggests that the more a person consumes palm wine, the higher the severity of the caries. This study provide findings about the effects of Tuak drinking habits on dental health, that could be used by the dental practitioners as a dental health education.

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Conflicts of interest

There are no conflicts of interest.

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