
THE SALTY TASTE THRESHOLD AND TONGUE CLEANING HABITS IN HEALTHY YOUNG ADULT MALE SMOKERS

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KATA KUNCI

Ambang batas rasa asin, kebiasaan membersihkan lidah, sehat, dewasa muda, laki-laki, perokok

ABSTRAK

Pendahuluan: Kebiasaan merokok memiliki efek buruk pada tubuh seperti berbagai jenis kanker, penyakit jantung koroner, stroke, penyakit pembuluh darah perifer, dan perubahan dalam rongga mulut termasuk berkurangnya sensasi rasa. Telah banyak penelitian tentang efek merokok terhadap ambang rasa, tetapi penelitian pada kelompok laki-laki usia dewasa muda dan data kebiasaan membersihkan lidah belum pernah dilaporkan. Tujuan penelitian ini adalah untuk mengetahui ambang rasa asin dan kebiasaan membersihkan lidah pada perokok laki-laki dewasa muda yang sehat. **Metode:** Penelitian ini adalah penelitian *cross-sectional* bersifat deskriptif, dan pengambilan subjek secara *consecutive sampling*. Kriteria subjek yaitu laki-laki sehat, berusia 18-24 tahun, memiliki kebiasaan merokok 10 batang atau lebih per hari dan telah merokok lebih dari 1 tahun. Pengambilan kuesioner dilakukan termasuk data kebiasaan membersihkan lidah sebelum pengukuran ambang rasa asin dengan menggunakan berbagai konsentrasi larutan natrium klorida yaitu 0,012 M, 0,014 M dan 0,016 M. **Hasil:** Subjek terdiri dari 76 laki-laki usia dewasa muda perokok selama 3-8 tahun. Terdapat 39%, 53%, dan 8% subjek dengan ambang rasa asin pada konsentrasi masing-masing 0,012M, 0,014M dan 0,016M. Subjek terbanyak memiliki kebiasaan merokok selama 4 tahun (36%), dan kebiasaan membersihkan lidah tidak dijumpai pada sebagian besar subjek (46%). **Simpulan:** Sebagian besar subjek memiliki ambang rasa asin lebih tinggi dari normal dan subjek lebih banyak yang tidak memiliki kebiasaan membersihkan lidah.

KEYWORDS

salty taste threshold, tongue cleaning habit, healthy, young adult, male, smoker

ABSTRAK

Introduction: Smoking has adverse effects on the body such as various types of cancer, coronary heart diseases, stroke, peripheral vascular diseases, and oral changes including decreased taste sensation. There have been many studies on the effects of smoking on taste threshold, but specific studies in a group of young adult males and data on the frequency of tongue cleaning habits have not been reported. This study aims to determine the salty taste threshold and tongue cleaning habits in healthy young adult male smokers. **Methods:** This study was a descriptive cross-sectional study, and the subjects were taken by consecutive sampling. The criteria for the subjects were healthy males, aged 18-24 years old, who had a habit of smoking 10 cigarettes or more per day and had smoked for more than 1 year. A questionnaire was conducted including data on tongue cleaning habits before measuring the salt taste threshold using various concentrations of sodium chloride solution which are 0,012M, 0,014M, and 0,016M.

Results: Subjects consisted of 76 healthy young adult male smokers for 3-8 years. There were 39%, 53%, and 8% of subjects with a salty taste threshold at concentration 0.012M, 0.014M and 0.016M respectively. Most subjects had a smoking habit for 4 years (36%), and the tongue cleaning habit was not found in the majority of subjects (46%). **Conclusion:** Most of the subjects had a salty taste threshold higher than normal and more subjects do not have the habit of cleaning the tongue.

INTRODUCTION

Until now, smoking is a global problem of civilization and a bad habit that is often picked up by many people. Indonesia has one of the highest prevalence of smoking in the world, with 62.9% of adult males smoking. Tobacco use kills about 225.700 Indonesians every year.¹ Even though the risk and bad effect of smoking are widely known, the number of smokers are still high among young adults especially university students. Cigarette contains at least 7000 toxic chemicals compounds that include chemical asphyxiants, irritants, chiliaistic compounds, carcinogen and co-carcinogens which is positively associated with nearly 40 diseases.² These substances cause various negative effects on systems in our body include the oral cavity. Smoking causes various diseases, including many types of cancers such as lung, liver, and pancreas cancer, coronary heart diseases, stroke,

and peripheral vascular diseases.^{3,4}

Cigarette smoke affects the oral cavity first, as it is where the smoking takes place. It could because of the staining of the teeth and development of oral diseases such as smoker's melanosis, periodontitis, hairy tongue, oral precancerous such as leukoplakia, and oral cancer. However, one of the effects of smoking that often go unrecognized by smokers is the reduction of the ability to taste.³

Nicotine and heat from a cigarette are the most influential substances that affect the ability to taste. Heat influences the cellular activity of oral mucosa such as increasing the keratinization of taste buds. Due to the keratinization on the tongue, the dorsal parts look coated by a white layer and it is called coated tongue or leukoplakia.⁵ The thickness of epithelium papilla due to smoking will be difficult to desquamate if the smoking activity continues because the keratinization will continue to occur.⁵

The oral hygiene in smokers is very risky to get worse with the formation of the coated tongue or hairy tongue as an indicator. All tongues are coated in a mixture of mucus, cells from the lining of the mouth, harmless bacteria, and other debris. In most healthy people, this is constantly removed by the tongue's movement and the flow of saliva.⁶ The accumulation of keratin cells, food debris, bacteria, and residue from cigarettes can accumulate continuously as long as the smoking habit exists. The mechanical cleaning is needed using tools such as a toothbrush or a tongue brush.⁷

Research done by Pavlos stated that nicotine may cause functional and morphological alteration of taste buds without severely affecting their number.⁸ When a cigarette is smoked, nicotine in the cigarette is condensed into the oral cavity and may stick to tongue papillae which contain taste buds especially on the upper surface of the tongue. A high level of nicotine in a cigarette can irritate the taste buds and interfere with the nerve impulses to the brain and influence the secretion of saliva thus decreasing the tongue sensation towards taste.⁹ The primary sensations of taste are sweet, salty,

sour, bitter, and umami. The ability to taste saltiness for a human is at the side of the front of the tongue. One can feel a sensation on the tongue when the flavor is consumed has reached a taste threshold value. The value for sweet, salty, bitter and sour taste threshold are different. The salty taste threshold for normal people using sodium chloride is 0,01M.¹⁰ A decreased ability to identify the presence of salt could lead to an inadvertent increase in salt intake and thus possibly contribute to cardiovascular diseases such as hypertension.¹

Several studies have stated the impact of smoking on taste thresholds. A research stated that smokers have a higher taste threshold.¹¹ Smoking can greatly decrease the taste sensitivity specified on sweet which highlights that there is a difference in taste threshold between smokers and non-smokers.⁹ Studies on salty taste thresholds in smokers have also been conducted in groups of a young adult females who have a higher tendency than normal.¹² However, no recent research about salty taste threshold in healthy young adult male smokers and cleaning tongue habit is conducted. Hence, we would conduct a study on

the salty taste threshold of healthy young adult male smokers and also collected data about tongue cleaning habits to provide additional information regarding the subject's condition.

METHODS

The population in this research is 6th-semester Geology students of Padjadjaran University who smokes, and all students are male. A total of 76 subjects were chosen in this research were assessed based on the following criteria which are healthy, has no history of systemic disease, male, 18-24 years old, smoke 10 or more cigarettes each day, does not consume any medicine that can involve taste alteration and willing to participate in this research. As for the pre-research procedure, ethical approval number 967/UN6.C.10/PN/2017 was obtained from The Health Research Ethics Committee Universitas Padjadjaran as consent to conduct the research. Subjects need to fill up the informed consent if subjects agree to take part in this research. Subjects were given a questionnaire to answer regarding the criteria needed for this research before proceeding to another step.

Prepare sodium chloride solution with

0,012M, 0,014M, and 0,016M. Small cups are arranged alternately between distilled water and sodium chloride in two columns. Make a series of subjects sodium chloride solution with 3 different concentrations. The concentration is sorted from the lowest concentration. Subjects are not allowed to drink, eat, or smoking 1 hour before the research is conducted. Subjects are given from the lowest concentration and need to swish with distilled water after tasted for every concentration. Each concentration given is 10 ml. The subject needs to swish the concentration until they can identify correctly the taste of the concentration.¹³ Every solution and distilled water is swish for 15 seconds for every subject.¹⁴ Operator record the concentration value when they can identify the taste. Evaluation step where the data is inspected and tabulated.

RESULTS

The characteristics of subjects based on age, and duration of smoking which summarized in Table 1. According to age, most subjects were 22 years old (70%). According to the duration of smoking, the highest number of

subjects smoke cigarettes for 4 years (36%) from total subjects and the least number of subjects smoke for 8 years (1%).

Table 1. Characteristics of Subjects

	Total (N=76)	Percentage (%)
Age		
21 years old	23	30
22 years old	53	70
Duration of smoking		
3 years	3	4
4 years	27	36
5 years	25	33
6 years	14	18
7 years	6	8
8 years	1	1
Σ(Total)	76	100

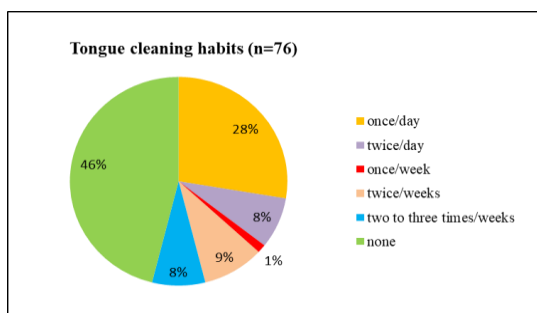
Salty taste threshold at concentrate 0.014 M obtained 40 subjects out of 76 subjects (53%) which the highest number of subjects. While 0.012 M with 30 subjects (39%) and 0.016 M is 6 subjects (8%)

which is the least number of subjects. The salty taste threshold at concentrate 0.012 M was mostly found in 12 subjects who had smoked for 4 years and did not have the habit of cleaning the tongue, whereas the concentration of 0.014 M was experienced at most in 8 subjects who had a smoking habit for 5 years and also never cleaned their tongue. The highest concentration tested, which is 0.016 M, was found in two subjects who had smoked for 6 and 7 years. One subject who had smoked for 8 years showed a salty taste threshold at concentrate 0.014 M with a frequency of cleaning his tongue once daily. (Table 2)

Table 2. Number of subjects according to the duration of smoking, frequency of tongue cleaning, and concentration of sodium chloride solution

Duration of smoking (years)	Tongue cleaning habit	Concentration of sodium chloride solution (n=76)		
		0.012 M	0.014 M	0.016 M
3	using tongue scrapper (twice/day)	1	0	0
	never clean the tongue	2	0	0
4	using tooth brush (once/day)	6	0	0
	using tooth brush (twice/day)	1	0	0
	using tooth brush (twice/week)	0	2	0
	using tooth brush (twice-three times /week)	0	1	0
	never clean the tongue	12	4	1
5	using tooth brush (once/day)	2	5	0
	using tongue scrapper (once/day)	1	0	0
	using tooth brush (twice/day)	4	0	0
	using tooth brush (twice/week)	1	1	0
	using tooth brush (twice-three times /week)	0	2	0
6	never clean the tongue	0	8	1
	using tooth brush (once/day)	0	3	1
	using tooth brush (twice/week)	0	3	0
	using tooth brush (twice-three times /week)	0	1	1
7	never clean the tongue	0	5	0
	using tooth brush (once/day)	0	3	0
	using tooth brush (twice-three times /week)	0	0	1

	never clean the tongue	0	1	1
8	using tongue scrapper (once/day)	0	1	0
	Sub Total	30	40	6
	Percentage (%)	39	53	8



Picture 1. Frequency of tongue cleaning habits

DISCUSSION

According to table 1, the age range of subjects between 21 years old and 22 years old. There is research that stated that the average age of starting smoking is 15 years old.¹¹ Therefore, the age of subjects in this research is above the average age of starting smoking. In this research, all subjects chose who smokes 10-20 cigarettes per day. Based on research states that the average number of cigarettes smoked per day for men is 13 sticks and the highest proportion is 10-14 sticks per day. Research states that most smokers in Indonesia consume moderate cigarettes per day which is 10-20 sticks per day.¹ Our research, subjects choose who are smoking cigarettes for more than a year. There are 3 to 8 years of smoking cigarettes among subjects. Previous

research reported that people who smoke less than 10 year shows mild changes in their oral mucosa including tongue.¹⁵

Based on table 2 above, all the subjects are being interviewed and asked about their tongue cleaning habit. Tongue cleaning can be used either by a toothbrush or tongue scraper.¹⁶ In this research, subjects were asked about tools that they used for tongue cleaning and how often they clean the tongue. Tongue brushing regularly aiming at removing the coating on the dorsum of the tongue.^{7,17} Daily tongue cleaning is more effective in improving taste threshold and recommends as daily routine personal oral care.^{18,19} A study state that taste ability due to smoking is significantly reduced with poor oral hygiene.²⁰ Scrapping of the tongue every day will help reduce tongue coating and improves taste sensation.¹⁶ A study proved that smoking ultimately affects taste buds and causes the formation of a thick residue on the tongue. Our study found that 35 subjects (46%) are not cleaning their tongue regularly, this can lead to the accumulation of keratinized epithelial

cells due to smoking and promote altered taste sensation on the tongue.

Almost all subjects show increasing in their salty taste threshold based on the data recorded so the data obtained shows an increment of salty taste threshold compared to the theoretical value of normal salty taste threshold. Our study is consistent with a recently published study that found smoking increases the taste threshold.^{12,21} However, the taste threshold on smokers also varies including tongue cleaning habits and duration of smoking. Nicotine in the cigarette may deposit to tongue and papillae and irritate the taste buds thus decreasing the tongue sensation towards taste.⁹ When a person is smoking and not cleaning their tongue daily so it decreasing taste sensitivity on the tongue. Hence, it can be said that taste threshold is related to tongue cleaning habits.

CONCLUSION

There is an increase in salty taste threshold on smokers and most of the subjects in this research salty taste threshold on smokers is 0,014M.

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