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Comparative Status of Saliva between Electric Smokers with Non-smokers

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Abstract*— Background:** *Electric smokers is the innovation of conventional cigarette becoming modern cigarette. People are switching from conventional cigarettes to electric smokers. Electric smoked produce a vapor/smoke that enters the mouth; it causes the condition of the oral cavity becoming hot. As a result of this hot oral state of the mouth affects the pH and saliva volume.* ***Purpose*: To determine the difference between the saliva status of electric smokers and non-smokers* ***Method****: This study was an observational study with Cross Sectional study design. The population of this study was Banderaz Vape Squad community and Teratai Youth Organization. The sample was taken by purposive sampling technique withcriterion of male, age 17-35 years old, users of electric cigarette, non-smokers, andthe duration of electric smokers usage more than one year. The sample was dividedby two different groups, 30 from the group of electric smokers and 30 from the non-smokers group. The data analysis used was Mann-Whitney test.* ***Result****: It was revealed that the average pH of electric smokers was categorizedacid, and the average pH of non-smokers categorized as neutral. The volume of electric smokers categorized slightly, and the volume of non-smokers categorizednormal. The difference of pH saliva of electric smokers and non-electric smokersgot significance value 0.000 (p<0.05) and it was known there was difference of salivary volume of electric smokers and non-smokers got significance value 0.047(p<0.05).* ***Conclusion****: There is a saliva status difference between electric smokers and non-smokers.*

Keywords*—pH saliva, saliva volume, electric smokers.*

I. INTRODUCTION

Saliva is a mixture of various fluids found in the oral cavity. This fluid comes from the major and minor saliva glands. Saliva functions as a cleansing fluid in the mouth, so it is needed in sufficient quantities. As a result of insufficient saliva will make the high amount of plaque in the mouth [1–3].

Saliva has different compositions and concentrations that can affect the condition of salivary secretion so that the oral cavity environment of each individual is different. Factors that affect the composition and concentration of saliva include salivary flow rate, volume, pH, and salivary buffer capacity. Salivary secretion can be influenced by stimuli received by the salivary glands. These stimuli can occur through mechanical stimuli such as chewing gum or hard food and chemical stimuli such as sour, sweet, salty, bitter and spicy tastes. One of the measurements of saliva volume can be done without stimulation (unstimulated whole saliva), namely the amount of saliva produced without either mechanical or chemical stimulation (such as chewing gum, paraffin, citric acid, etc.) and expressed in ml [4–6].

Electronic cigarettes are an alternative choice for active smokers who slowly want to quit conventional smoking habits. Electric smokers are considered as healthy cigarettes with lower tar content compared to conventional cigarettes. Electric smokers users or what is often called vape among teenagers are not a rare sight, electric smoking is an innovation from tobacco cigarettes to modern cigarettes. The relationship between electric smokers and oral health is as bad as conventional smoking in general [7–9].

Based on a preliminary study that researchers conducted on electric smokers and non-smokers by direct examination to see saliva pH and saliva volume. At the time of examination, it was found that 10 electric smokers had an average pH below 7, which means acidic, with an average volume of 1.2 ml. while non-smokers have an average pH of 7 and average volume of 1.4 ml.

II. RESEARCH METHODOLOGY

This type of research is an observational study with a cross sectional research design. This research was conducted from March to April 2018. The population is the Banderaz Vape Squad community and members of the Teratai Youth Organization. Samples were taken by purposive sampling technique with criteria for male gender, age 17-35 years, electric smokers users, non-smokers, and duration of use of electric smokers for more than 1 year. The sample was divided into 2 different groups, 30 from the electric smoker group and 30 from the non-smoker group. The variables of this study include salivary pH and saliva volume. Data analysis used the Mann-Whitney test

III. RESEARCH RESULT

TABLE I. Characteristics of the study participants

Age	Frequency	Percent
18 - 21	31	51.7
22 – 26	24	40
27 - 31	5	8.3
Total	60	100

Table I shows that shows that the majority of respondents in the study are aged 18-21 years, namely 31 respondents, with a percentage of 51.7%.

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TABLE II. Frequency distribution of the saliva pH of electric smokers and non-smokers

Saliva pH	Electric smokers		Non-smokers	
	Frequency	Percent	Frequency	Percent
Acid	22	73.3	5	16.7
Neutral	8	26.7	22	73.3
Alkaline	0	0.0	3	10.0
Total	30	100	30	100

Table II shows that the pH of respondents who smoke electric, which is the most acid pH as many as 22 respondents (73.3%), while the pH of non-smoker respondents is mostly neutral pH as many as 22 respondents (73.3%).

TABLE III. Frequency distribution of saliva volume of electric smokers and non-smokers

Volume	Electric smokers		Non-smokers	
	Frequency	Percent	Frequency	Frequency
Small	18	60	Small	18
Neutral	3	10	Neutral	3
Large	9	30	Large	9
Total	30	100	Total	30

Table III shows that saliva volume of the electric smoker respondents, the most of which is the small saliva volume, as many as 18 respondents (60.0%), while the saliva volume of the non-smoker respondents is the most normal saliva volume as much as 12 (40.0%).

TABLE IV. The results of the analysis of the difference test using the Mann-Whitney test

Variable	α	p-value
Saliva pH	0.05	0.000
Saliva volume	0.05	0.047

Table IV shows that the p-value of the saliva pH of electric smokers and non-smokers is 0.000 (<0.05), so it can be concluded that there is a difference in salivary pH between electric smokers and non-smokers, while the p-value for the saliva volume of electric smokers and non-smokers of 0.047 (<0.05) it can be concluded that there is a difference in saliva volume between electric smokers and non-smokers.

IV. Discussion

This study aims to determine the comparison of saliva status between electric smokers and non-smokers. The results of the comparison study of saliva status between electric smokers and non-smokers showed that the age of the most respondents in the study was aged 18-21 years, namely 31 respondents, with a percentage of 51.7%.

This study aims to determine the comparison of salivary status between electric smokers and non-smokers. Based on the research that has been done in Banderaz Vape Squad and Teratai Youth Organization, data from Table I has been obtained, showing that the age of the most respondents in the study is aged 18-21 years, namely 31 respondents, with a percentage of 51.7%.

Based on the results of the research that has been carried out, it shows that 22 respondents of electric smokers have an acid saliva pH (table II) and 22 non-smokers respondents have a neutral saliva pH (table II). This shows that the saliva pH in the electric smoker group is lower than the non-smoker group.

The average pH value of smokers is higher than that of non-smokers. The average pH of smokers is 6.7 (acidic) while the pH of non-smokers is 7.4 (neutral). This study shows that there is indeed a difference in salivary pH between smokers and nonsmokers. Many factors affect the pH of a person's saliva, one of which is smoking. Smoking can affect the pH of saliva. Smoking can affect the pH of saliva. Cigarette smoke that continuously spreads in the oral cavity causes a lack of sensitivity and changes in the receptors of the sense of taste which causes suppression of the salivary reflex. This change has an impact on the saliva flow rate which greatly affects the pH value of saliva. There are currently electric smoker that contain nicotine, depending on the composition of the liquid used. Salivary pH is lower in smokers compared to non-smokers, this is due to a decreased saliva buffering response caused by the effects of nicotine contained in the cigarette. Saliva flow gradually decreases due to exposure to nicotine [10–12].

The results showed that 18 respondents of electric smokers had a small amount of saliva with criteria (table III). Meanwhile, 12 non-smokers had saliva volume with normal criteria (table III). The normal volume of unstimulated saliva is 0.3 mL in 1 minute. Thus, within 5 minutes the total volume of unstimulated saliva that can be collected is normally 1.5 mL. So those less than 1.5 are included in the few criteria, and those more than 1.5 mL are included in the many criteria. Many factors affect a person's saliva volume, one of which is smoking. Cigarettes can affect the volume of saliva, smokers have a lower amount of saliva than respondents who have non-smoker status. Because smoking can significantly affect the decrease in saliva volume. There is a significant difference in the amount of saliva between smokers and non-smokers, long-term smoking causes saliva to decrease significantly. A decrease in the amount of saliva in smokers is associated with smoking duration. Smoker's saliva has a thicker quality of saliva compared to non-smokers. The effects of smoking affect the salivary glands, the first being the parotid glands, which act as saliva secretions. The loss of function is compensated by the submandibular and sublingual glands which secrete mucous saliva. This explains that the smoker's saliva is thicker [13,14].

Based on data analysis using the Mann-Whitney test to determine the difference in saliva pH of electric smokers and non-smokers, a significance value of 0.000 ($p < 0.05$) was obtained, which means that there was a significant difference between the pH of electric smokers and the pH of non-smokers. The average pH of smokers' saliva is lower than that of nonsmokers' saliva. The average saliva pH of smokers is 6.7 lower than that of non-smokers, ie, 6.8. Data analysis using the Mann-Whitney test to determine the difference in saliva volume of electric smokers and non-smokers obtained a significance value of 0.047 ($p < 0.05$), which means that there is a difference between the saliva volume of electric smokers and non-smokers. Smoking has an effect on decreasing smoker's saliva, that is, the more you smoke, the lower the volume of saliva produced [12,15].

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V. CONCLUSION

Based on the results of the study, it can be concluded that:

1. Electric smokers have an average saliva pH in the acid category and non-smokers have an average saliva volume in the neutral category.
2. The average saliva volume of electric smokers is in the low criteria and the saliva volume of non-smokers is on average within the normal criteria.
3. There is a significant difference in saliva pH between e-smokers and non-smokers and there is a difference in saliva volume between e-smokers and non-smokers.

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