

RESEARCH ARTICLE

Correlations between a Smoking Habit and Teeth, Gums, and Lips Discoloration Issues on Active Smoker

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Abstract

According to the Central Statistics Agency, the percentage of smokers among Indonesians aged 15 years is relatively high. It was 32.20%, 29.03%, and 28.69%, in 2018, 2019, and 2020 respectively. Cigarettes contain tar that changes into a solid and builds up colored plaque when entering the mouth. Perpetual cigarette smoke causes brown pigmentation on the mucosa, known as smoker's melanosis. Smoker's melanosis is abundant in gums and lips. This study's objective was to analyze the correlations between a smoking habit with teeth, gums, and lips discoloration in an active smoker. This study was an observational analysis with a survey approach from January to May 2021 in Bandung. The sample was 100 males, consisting of 38 active smokers and 62 non-smokers as a comparison group. Data were analyzed by Pearson and Spearman test. This study shows a significant correlation between smoking habit and teeth discoloration ($p=0.01$), also shows a statistically significant correlation between a smoking habit and gum discoloration ($p=0.00$), and there is a significant correlation ($p=0.00$) between a smoking habit and lips discoloration. In conclusion, there is a correlation between a smoking habit and teeth, gums, and lips discoloration.

Keywords: Discoloration, gums, lips, smoking, teeth

Introduction

Data from Statistics Indonesia showed that smoking among Indonesians aged 15 years is relatively high.¹ Smoking harms almost every part of our body and increases our risk of many diseases. Dental stain and mucosa discoloration are the main issues in smokers.^{2,3}

Cigarettes produce imperfect combustion building up in the body when inhaled. In general, cigarettes consist of two main parts; 92 % of gas and 8% solid or particles. Carbon monoxide, carbon dioxide, hydrogen cyanide, ammonia, oxidation of nitrogen, and hydrocarbon compounds are substances forming cigarette smoke components. Smoke particle components are tar, nicotine, benzantracene, benzopiren, fenol, cadmium, indole, karbazol dan cresol. These substances are poisonous, irritating, and carcinogenic.⁴ Additionally, tar contains thousands of chemicals in solid cigarette particles of smoke components, entering the oral cavity as solid vapor when inhaled. After it becomes cold,

it becomes solid and builds up brown sediment on tooth surfaces, respiratory tract, and lungs.⁵⁻⁸

Cigarettes harm oral health since they can cause damage to hard and soft tissues in the oral cavity.⁵ Tobacco on cigarettes produces liquid in the oral cavity, which penetrates to pit and tooth fissures and then sediments on teeth surfaces.²

Tooth discoloration or stain can cause esthetic issues that can impact psychologically, especially on anterior teeth.⁹ Additionally, the stain can also cause rough tooth surfaces, making it easy to build up leftover food and bacteria that eventually form plaque. Chronic invasion of plaque bacteria into the gingival margin can cause gingivitis, leading to periodontitis. Severe periodontitis causes gingiva recession and also losing alveolar bone and teeth caused by chronic cell inflammation.^{7,8}

Being exposed to cigarette smoke can continuously stimulate oral mucosa melanosis and produce excess melanin, leading to brown pigmentation on the known smoker's melanosis of the oral mucosa.¹⁰ Smoker's melanosis often occurs in gums, palates, and lips.¹¹ Smoker's

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melanosis appears to be multifocal spots seen as grey to brown pigmentation with random distribution and patterns.⁶

This anomaly is not dangerous, but it has negative aesthetic appeal if untreated. Smoker's melanosis can be found in 25–35% of smokers and increase significantly in the first year. Pigmentation will spread when someone smokes longer.¹² The results also showed a relationship between the number of cigarettes smoked per year with the occurrence of smoker's melanosis, which causes staining of teeth, gums, and lips.¹³

The government has issued some regulations to control diseases caused by smoking and exposure to cigarette smoke. For example, regulation Number 36, in 2009, regarding health, and Government Regulation Number 109, in 2012, about safety measures for materials containing addictive substances in tobacco products that harm health. In that Government Regulation, all tobacco products issues have been suggested not to disturb and endanger the health of personal, family, and society. This cigarette control has been implemented by applying non-smoking zones in some areas.¹⁴ The study area, a university in Bandung, is one of the universities that implement non-smoking zones after issuing University Regulation Number 187/L.03/SK/Rek/X/2018 about non-smoking zones in campus area officially implemented on 31 October 2018. However, data from previous studies show that university staff still have a smoking habit outside of campus areas. This leads to a negative impact on health and the possibility of building up a discoloration on teeth, gums, and lips.

This study's objectives were to analyze the correlation between a smoking habit and issues of teeth, gums, and lips discoloration on active smoker staff at a university in Bandung.

Methods

This study design was analytical observation research with a survey approach from January to May 2021 in Bandung. Data was primary data in a questionnaire which already been validated. The author conducted the socialization and informed consent before the study. This study has 100 samples of male staff consisting of 38 active smokers and 62 non-smokers as a comparison group. Inclusion criteria of this study were male staff and active smokers (who smoked every day for at least six months and still smoked at the

time of the survey), and exclusion criteria were people who had diabetes mellitus, TBC, HIV, leukemia, hemophilia, and thalassemia. Each subject of the study was assisted during an online questionnaire. In this study, active smokers were not subgrouped based on a long time of smoking and the number of cigarettes smoked because of the small number of respondents who had a smoking habit. Therefore, even though the total population of male employees was taken, a minimum of 30 respondents was needed in each subgroup. Still, the number of active smokers in this study was only 38 people who have a smoking habit.

The independent variable was discoloration on teeth, gums, and lips. The dependent variable of this study was smoking habit. This study was not observed directly in the respondent's oral cavity by the researcher because this study was conducted during the COVID-19 pandemic. Subjects were asked to see the condition of their teeth, gums, and lips directly through a mirror whether there were black-brown stains on the surface of the teeth, which were the result of the tobacco burning residue.¹⁵ Respondent asked to see staining on the gums in the form of a dark purplish color or spots—irregular light brown.¹⁵ Respondent asked to see staining on the lips, which presents as a diffuse black-brown stain.¹⁶ Respondents clicking on the option there is discoloration of teeth, gums, and lips if they get the discoloration condition on their teeth, gums, and lips.¹⁷ Subjects can easily recognize the presence of discoloration of the teeth, gums, and lips because this discoloration affects the aesthetics of a person's face.¹⁸ Primary data taken was then processed and analyzed. Since this study was correlation analytical research, data analysis used Pearson and Spearman correlation test.¹⁹

This study had received ethical approval from the Health Research Ethics Committee of Universitas Islam Bandung, number: 002/KEPK-Unisba/III/2021.

Results

The study results were analyzed by Pearson and Spearman correlation test shown in Table. Ten people had teeth with discoloration, with the most significant proportion being the active smokers' group (21%), exceeding the non-smokers' group (only 3%). There is a significant correlation between a smoking habit and teeth discoloration

Table Correlation of Smoking Habit with Teeth, Gums, and Lips Discoloration

Organs	Smoking Habit	No Discoloration		Discoloration		Total		p
		n	%	n	%	n	%	
Teeth	Non-smokers	60	97	2	3	62	100	0.01
	Active smokers	30	79	8	21	38	100	
	Total	90	90	10	10	100	100	
Gums	Non-smokers	59	95	3	5	62	100	0.00
	Active smokers	32	84	6	16	38	100	
	Total	91	91	9	9	100	100	
Lips	Non-smokers	55	89	7	11	62	100	0.00
	Active smokers	21	55	17	45	38	100	
	Total	76	76	24	24	100	100	

($p=0.01$).

Gums discoloration was only found in 9 respondents, with the most significant proportion among the active smokers' group (16%). Statistically, there is a significant correlation ($p=0.00$), yet a further study is needed with a more substantial number of samples since p value approached determined alpha (0.05).

Respondent's proportion having lips discoloration was 24%, with the most significant proportion being in the active smokers' group (45%). A significant correlation was statistically ($p=0.00$) between a smoking habit and lips discoloration. Respondents who were non-smokers also found tooth staining (3%), gum staining (5%), and lip staining (11%).

The result can be caused because the respondent has a history of being an active smoker, but he no longer smokes when the data was collected.²⁰

Discussion

Smoking is a bad habit that can cause long-term effects on body health and the oral cavity. Dental stain and mucosa discoloration in the oral cavity are common issues for smokers.²

In this study, active smokers also had a dental stain that caused teeth discoloration. This study follows the results of previous studies, which showed a significant correlation between a smoking habit and teeth discoloration.^{15,21} Other studies also showed a correlation between a smoking habit and stain buildup. However, there was no correlation between smoking, types of smoke, the number of cigarettes inhaled daily, and stain buildup.¹⁵ Discoloration (color change)

is an extrinsic color change caused by tobacco in cigarettes. A substance causing stains in cigarettes is tar as a result of combustion. Tar consists of 6,000 chemicals that are cigarette solid vapor components. When inhaled, tar enters the oral cavity as a solid vapor that, after cold, becomes solid and builds up yellowish-brown sediment on tooth surfaces, skin, and nails.^{17,22} This caused some aesthetic problems¹⁸ that can cause a significant psychological and sociological impact, primarily when it builds upon anterior teeth.^{3,9}

Additionally, thickening stain sediment can cause rough teeth surfaces that lead to plaque buildup, irritating gums that lead to gingivitis, which next can lead to periodontitis.^{7,23}

There were issues on active smokers of gums and lips discoloration. The previous studies suggested that smoking could affect gingival pigmentation, periodontal tissues, and lips.¹³

Discoloration on gums and lips that is another effect of a smoking habit is smoker's melanosis, in which the characteristic is brown mucosa due to increased melanin production by melanocytes. However, pigmentation is reversible and can disappear if a smoking habit is stopped.^{24,25} The previous studies suggested that the contribution of a smoking habit toward a smoker's melanosis was 94%.²² The cause of smoker's melanosis is due to the effect of nicotine (polycyclic compound) on melanocyte cells located along with basal epithelial cells of oral mucosa tissues. Nicotine stimulates melanocytes to produce excess melanosome that increases melanin production.² Smoker's melanosis is an anomaly in the oral cavity, yet it is harmless. However, if it is untreated, it can harm aesthetics. Smoker's melanosis appears in 25–31% of smokers and

increases significantly during the first year of smoking. Pigmentation will spread widely if a person smokes for a more extended period. It shows that the longer a person smokes, the higher risk of causing smoker's melanosis.¹²

This study used patient perceptions to assess discoloration. It would have shown a better result if it had been completed with clinical examinations of respondents. However, due to the COVID-19 pandemic, the examinations were challenging to be done with a high risk of COVID-19 exposure.

Conclusion

Referring to the result of the study, we conclude that there is a significant correlation between a smoking habit and teeth, gums, and lips discoloration.

Conflict of Interest

There was no conflict of interest in this study.

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