Correlation between dental health maintenance behavior with Dental Caries Status (DMF-T)

Made Ayu Lely Suratri, Indirawati Tjahja N, Vivi Setiawaty

ABSTRACT

Background: The maintenance of oral and dental health is closely related to the people’s behavior. Behavior or habits that may influence the development of dental caries is the eating habits as well as oral hygiene such as brushing the teeth regularly and adequately. Dental caries status is a condition that describes a person’s experience of dental caries which is calculated by the index DMF-T.

Objective: The study aims to determine the relationship between the behavior or habit of maintaining the teeth and mouth with dental caries status of communities in Indonesia.

Methods: It was an observational study with cross-sectional study design. The samples were household members aged ≥ 15 years with the number of 173,828 people. Data were collected by interview and examination of the teeth and mouth.

Results: The result showed that the respondents with dental caries more than the respondent without dental caries (92.60%). There was a significant relationship between hygienic behavior with dental caries status (P = 0.004; OR = 1.426; 95% CI = 1.123-2.810). However, there was no significant relationship of behaviors/habits of eating fruits and vegetables with dental caries status (P = 0.145; OR = 1.107; 95% CI = 0.966-1.270). But, there was a significant relationship between habitual physical activity with dental caries status (P = 0.000; OR = 1.443; 95% CI = 1.350-1.543).

Conclusion: There is a significant relationship between physical activity and hygiene behavior with dental health maintenance related to dental caries status. However, the behavior of eating fruits and vegetables has no significant relationship with dental caries status.

Keywords: Behaviors or habits, Dental Health Maintenance, Dental Caries Status

INTRODUCTION

The prevalence of dental caries in developed countries is decreasing, while in underdeveloped and developing countries, the prevalence is on the rise. Dental caries status is a condition that describes a person’s dental caries experience and calculated by the DMF-T Index (Decayed, Missing, Filled). Dental caries is one of the teeth and mouth problem that caused by demineralization of enamel and dentine which closely related to the consumption of cariogenic foods. Dental caries is a multifactorial problem, and to be the occurrence of a process of dental caries; it needs the interaction of four factors such as the host, microorganisms, substrates, and period of time. These four factors must work together to make the process of dental caries. The process of dental caries begins with the presence of plaque on the tooth surface.

The severity degree of dental caries in Indonesia is very high. The National Basic Health Research (Risksdas) in 2013 described the prevalence of the Indonesian population who has problems with the dental and the mouth is 25.9%. The average dental caries as measured by the DMF-T index is 4.6 which means an average population of Indonesia has experienced tooth decay as much as 5 teeth and who received dental care from dental medical personnel by 31.1%. The highest proportion of people with dental and oral problems is in the 35-44 years and 45-54 years age group (30.5% and 31.9%, respectively). This situation shows that the dental and oral problems may occur in the productive age group.

World Health Organization (WHO) in 2010 has been targeting the DMF-T index is 1.0 while developing countries set caries index was 1.2. Various indicators have been determined by WHO for dental caries. Among others, 90% of 5 years old children should be free of caries, children aged 12 years have index DMF-T for 1, people aged 18 years have no extracted tooth (M = 0), and people aged 35-44 years have at least 20 teeth function by 90%.

According to Bahar in Warni L. (2009), one of the main factors that influence dental and oral health population in developing countries is the behavior or habit. Behaviors that can affect the development of dental caries is the eating habits such as eating fruits and vegetables and maintenance of dental and oral hygiene, for example, regular brushing. The 2013 National Health Research reported that people’s behavior on the maintenance of dental health in the population groups ≥ 10 years with daily tooth brushing proportion was 93.8%, but the habits of the Indonesia population brush their teeth correctly (after breakfast and before bedtime) was only 2.3%.

5* Correspondence to: Vivi Setiawaty, Research and Development Center of Biomedical and Basic Health Technology, NIHRD, Jakarta, Indonesia vivisetiawaty@hotmail.com

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Dental and oral health status is very closely related to the behavior or habits of the dental and oral health maintenance. According to Antisari in Wahyu et al. (2013) behavior plays a major role in influencing dental and oral health status. Therefore, the importance of influencing behavior in dental and oral health status can affect both poor dental and oral hygiene including the scores of caries and periodontal disease. This study aims to determine the relationship between behavior or habits with dental caries status in the Indonesia community.

METHODS

It was an observational study by using cross-sectional design. The data of dental and oral examinations were collected from the National Institute Health Research and Development (NIHRD), Ministry of Health of the Republic of Indonesia through the National Basic Health Research in 2013. The study population was the Indonesia population from 33 provinces and 497 district/cities. The samples criteria were all members of the household with aged ≥ 15 years (because since the age of 15 years permanent teeth have grown up until the second molar teeth). Total sample size was 173,828 respondents. The selection of the sample was using census block sample frame from the National Institute Central of Statistics (BPS).

### Table 1 Characteristics of Respondent

| Variable     | N      | %    | No  | Yes |
|--------------|--------|------|-----|-----|
| Age          |        |      |     |     |
| < 30 years (young) | 62,445 | 35.90 | 188 | 62,257 |
| ≥ 30 years (old)  | 111,383 | 64.10 | 12,602 | 98,781 |
| Total         | 173,828 | 100  | 12,790 | 161,038 |
| Gender        |        |      |     |     |
| Male          | 85,917 | 49.40 | 7,033 | 80,878 |
| Female        | 87,911 | 50.60 | 5,757 | 80,160 |
| Total         | 173,828 | 100  | 12,790 | 161,038 |
| Education     |        |      |     |     |
| Higher        | 55,789 | 32.10 | 1,255 | 54,534 |
| Lower         | 118,039 | 67.90 | 11,535 | 106,504 |
| Total         | 173,828 | 100  | 34,504 | 161,038 |
| Occupation    |        |      |     |     |
| Work          | 104,189 | 59.90 | 6,773 | 97,415 |
| Not Work      | 69,639 | 40.10 | 6,017 | 63,623 |
| Total         | 173,828 | 100  | 12,790 | 161,038 |
| Socioeconomic |        |      |     |     |
| Poor          | 58,085 | 33.40 | 5,889 | 52,146 |
| Not Poor      | 115,743 | 66.60 | 6,901 | 108,842 |
| Total         | 173,828 | 100  | 34,505 | 161,038 |

The data samples were complex with include strata (variable age, education, and socioeconomic status) and Primary Sampling Units (dental caries, hygienic behavior, eating fruits and vegetables, and physical activity). Analysis techniques were performed using univariate, bivariate, then followed by logistic regression.

The implementation of data collection of dental and oral health through interviews (for the behavior or habits) and observations (Index DMF-T) by using the mouth mirror instruments with the help of sunlight lighting (flashlight).

### RESULTS

The study showed that about 92.60% of respondents with age ≥ 15 years has Dental Caries (Table 1). In addition, table 1 also shows that the number of respondents without dental caries who had aged ≥ 30 years are more than < 30 years (12.602 vs 188), and the male respondents without the dental caries are more than female respondents (7.033 vs 5.757). Furthermore, the analysis of the education respondents without dental caries found that lower education had more dental caries than higher education (11.535 vs 1.255). Besides, the respondents with dental caries who work are more than not work (6.773 vs 6.017).

In this study, the age was divided into two groups, ≤ 30 years of age and > 30 years of age. Furthermore, the education was divided into two groups, higher and lower (higher > junior high school; lower ≤ junior high school). Socio-Economic Status was divided into two groups, poor and not poor. The National Basic Health Research 2013 was approved by NIHRD Ethics Committee, Ministry of Health, Republic of Indonesia No. 01.1206.207.

In addition, Table 4 shows a significant relationship between physical activity behavior and
dental caries status (P = 0.000; OR = 1.443; 95% CI = 1.350-1.543). Physical activity behavior has a significant relationship with dental caries status, where the inadequate of physical activity behavior was having 1.44 times higher risk for dental caries.

In Table 5, the hygienic behavior and physical activity have a significant relationship with dental caries status (P < 0.05), meanwhile the behavior of eating fruits and vegetables has no significant relationship with dental caries status (P > 0.05).

DISCUSSION

About 161.038 of 173.828 respondents (92.60%) had dental caries where the number of respondents who aged ≥ 30 years were more than age <30 years. In addition, the female respondents also encountered more than male respondents, as well as the lower education respondents, have more dental caries than the highly educated respondents.

Costa SM et al. reported the study results in adults that the socioeconomic, education, and occupation effect on dental caries, whereas people with low socioeconomic found that having more severe dental caries. In low-income families, the severity of dental caries greater than high-income.

Zemaitiene M et al. in 2016 conducted a study in Lithuania found that the prevalence of dental caries was relatively high, and the different experiences in dental caries between people in urban and rural areas were influenced by their socioeconomic differences. In rural areas, the DMF-T was higher

Table 2  Relationship of Hygienic Behavior with Dental Caries Status

| Hygienic Behavior | Dental Caries | OR (Odds Ratio) | p Value |
|-------------------|--------------|----------------|---------|
|                   | No | % | Yes | % |                   |         |
| Yes               | 153 | 4.0 | 3.679 | 96.0 | 1.426 | 0.004 |
| No                | 10.859 | 8.7 | 114.009 | 91.3 |            |         |
| Total             | 11.012 | 8.6 | 117.688 | 91.4 |            |         |

Table 3  Relationship Behavior of Eating Fruits and Vegetables with Dental Caries Status

| Behavior of Eating Fruits and Vegetables | Dental Caries | OR (Odds Ratio) | p-Value |
|-----------------------------------------|--------------|----------------|---------|
|                                         | No | % | Yes | % |                   |         |
| ≥ 5 portions/day                        | 10,081 | 94.1 | 631 | 5.9 | 1.107 | 0.145 |
| < 5 portions/day                        | 140,434 | 92.9 | 10.775 | 7.1 |            |         |
| Total                                   | 150,515 | 93.0 | 11.406 | 7.0 |            |         |

Table 4  Relationship of Physical Activity Behavior with Dental Caries Status

| Physical Activity Behavior | Dental Caries | OR (Odds Ratio) | p-Value |
|----------------------------|--------------|----------------|---------|
|                            | No | % | Yes | % |                   |         |
| Adequate                   | 3,807 | 6.9 | 51,747 | 93.1 | 1.443 | 0.000 |
| Inadequate                 | 8,983 | 7.6 | 109,291 | 92.4 |            |         |
| Total                      | 12,790 | 7.4 | 161,038 | 92.6 |            |         |

Table 5  The Logistical Regression Analysis of Dental Caries Status by Behavior or Habits Hygienic, Eating Fruits and Vegetables, and Physical Activity

| Behavior or Habits | OR (Odds Ratio) (95% CI) | p Value | OR (Odds Ratio) (95% CI) | p Value | p Value |
|--------------------|--------------------------|---------|--------------------------|---------|---------|
| Hygienic           | 1.402 (1.096-1.793)       | 0.007   | 1.426 (1.123-1.810)      | 0.004   |         |
| Eating Fruits and Vegetables | 1.107 (0.966-1.270) | 0.145 | -                        | -       | -       |
| Physical Activity  | 1.434 (1.334-1.541)       | 0.000   | 1.443 (1.350-1.543)      | 0.000   |         |
than urban areas, whereas the DMF-T according to the gender were higher in male compared with female. The results of this study showed a significant relationship between hygienic behavior with dental caries status (P = 0.004; OR = 1.426; 95% CI = 1.123-2.810). The respondents with hygienic behavior showed having a lower incidence (4.0%) for dental caries in compared with unhygienic behavior (8.7%).

The study which was conducted in India about the positive attitudes and behaviors of dental and oral hygiene associated with the positive outcome for a dental and oral health condition. Bozorgmehr E et al. reported that the behavior of the dental and oral health of parents like brushing is essential, due to as a determinant of behavior in their children. So by increasing the knowledge, attitudes and behavior of parents can also influence the behavior and status of dental and oral health in their children.

The relationship between behaviors/habits of eating fruits and vegetables with dental caries status is not significant, with a value of p > 0.05 (p = 0.145). Accordingly, it means there is no relationship between behavior/habit of eating fruits and vegetables with dental caries status (OR = 1.107; 95% CI = 0.966-1.270). Decker et al. (2003) reported that eating raw fruits or vegetables can increase saliva flow; to reduce the risk of erosion and dental caries, and included in foods that can prevent the influence of Acidogenik. The results of the study from Sari, RD et al. found that there was no difference in plaque pH between those who consume fruits with a group that did not consume fruits. Plaque is the cause of dental caries. Plaque control can be overcome by eating foods that are clean the teeth, that is fruits and vegetables. In addition, this study also showed a significant relationship between behaviors/ habits of physical activity with dental caries status (P = 0.000; OR = 1.443; 95% CI = 1.350-1.543). A similar study from Alswat K et al. (2015) also reported a positive correlation between physical activities (exercise) with dental caries status. Physical activity in the long term can be influential in dental caries.

CONCLUSION

From these results, it can be concluded that the behavior or habits of hygienic and physical activity have a significant correlation with the dental caries status, while the behavior or habit of eating fruits and vegetables was not associated with dental caries status.

COMPETING INTERESTS

The authors declare that there are no competing interests.

AUTHORS’ CONTRIBUTIONS

Made Ayu Lely Suratri, and Indirawati Tjahja N participated in the design and data collection and participated in data analysis and interpretation. Vivi Setiawaty also participated in the data analysis, interpretation, and drafting of the manuscript. All authors read and approved the final manuscript.

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REFERENCES

1. Farooqi FA, Khabeer A, Mohheet IA, Khan SQ, Farooq I, ArRejaie AS. Prevalence of dental caries in primary and permanent teeth and its relation with tooth brushing habits among school children in Eastern Saudi Arabia. Saudi Med J. 2015; 36(6): 737-42
2. Mintjelungan RC, Mariati NW. The Description of Caries Status and Patterns of Dental and Oral Health Care in the College Student from Ternate City, Manado. Jurnal e-GiGi (eG). 2013; 1(1) : pages. 45-51
3. Suratri MAL, Sintawati FX, Andayasari L. Knowledge, Attitudes and Behavior of Parents about Oral and Dental Health among Kindergarten Age Children in The DIY Province and Banten Province. 2014. Media Penelitian dan Pengembangan Kesehatan. 2016; 26(2): 119-126
4. Jose O, Cortes G, Carlo E, Solis M, Juan P, Jorge A, et al. Dental caries’ experience, prevalence and severity in Mexican adolescents and young adults. Mexico: Sauld Publica. 2009: 83-84
5. Ministry of Health Republic of Indonesia, The Principals Results of Basic Health Research in 2013, National Institute of Health Research and Development, 2014. Available from: http://www.litbang.depkes.go.id
6. Ministry of Health Republic of Indonesia, Basic Health Research Report, National Institute of Health Research and Development. 2007
7. Wiarni L. Relations student behavior grade V and VI on the dental and oral health of the dental caries status in the Old Deli, Districts of Deli Serdang. Research Report for Thesis. Faculty of Public Health, University of North Sumatra. 2009
8. Widayati N. Factors Associated with Dental Caries in Children Aged 4-6 Years. Jurnal Berkala Epidemiologi. 2014; 2(2): 196-205.
9. Suratri MAL, Notohartojo JT. Smoking as a Risk Factor of Periodontal Disease. Health Science Journal of Indonesia. 2016; 7(2): 107-112
10. Hastomo SP. Health Data Analysis, Faculty of Public Health, University of Indonesia, Jakarta. 2007
11. Costa SM, Martins CC, Bonfim MC, Zina LG, Paiva SM, Pordeus IA, et al. A systematic review of socioeconomic indicators and dental caries in adults. Int J. Environ Res Public Health. 2012; 9(10): 3540–3574
12. Costa SM, Vasconcelos M, Abreu MHNG. High Dental Caries among Adults Aged 35 to 44 Years: Case-Control Study of Distal and Proximal Factors. Int J. Environ Res Public Health. 2013; 10(6): 2401–2411
13. Zemaitiene M, Grigalauskiene R, Vasiliauskiene I, Saldunaite K, Razmiene J, Slabsinskiene E. Prevalence and severity of dental caries among 18-year-old Lithuanian adolescents. Medicina (Kaunas). 2016; 52(1): 54-60
14. Sharda AJ, Shetty S. Relationship of periodontal status and dental caries status with oral health knowledge, attitude, and behavior among professional students in India. Int J. Oral Sc. 2009; 1(4): 196–206
15. Bozorgmehr E, Hajizamani H, Mohammadi TM. Oral Health Behavior of Parents as a Predictor of Oral Health Status of Their Children. International Scholarly Research Notices. 2013; Article ID 741783, 5 pages http://dx.doi.org/10.1155/2013/741783
16. Decker RT, Loveren CV. Sugar and Dental Caries. The American Journal Clinical Nutrition. 2003; 78 (suppl): 881S–92S
17. Sari RD, Kayo VN. Effectiveness Consumption of Apples, Cucumbers, Bengkoang to decrease of pH plaque. Journal of Poltekkes Jambi. 2013; 8: 6-12
18. Alswat K, Mohamed WS, Wahab MA, Aboelil AA. The Association Between Body Mass Index and Dental Caries: Cross-Sectional Study. J Clin Med Res. 2016; 8(2): 147-151
19. Begum M, Nagamalleshwari M, Srinivas P, Gadagi JS, Gadde P, Jyothirmai K. Is body mass index truly related to dental caries? Survey on predisposing factors for overweight among Indian school children. Dent Hypotheses. 2014; 5:150-4
20. World Health Organization (WHO). Global recommendations on physical activity for health; 2010. http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf

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