The Role of Education for 21 Days in Improving the Effectiveness of Brushing Teeth of Children Age 5 – 8-year-old in Pembeliangan Village North Kalimantan

Risqa Rina Darwita[1*], Cymilia Gityawati[3], Peter Andreas[1], Febriana Setiawati[1], Sri Angky Soekanto[2]

1. Department of Dental Public Health and Preventive Dentistry, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia.
2. Department of Oral Biology, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia.
3. Undergraduate Student, Faculty of Dentistry, Universitas Indonesia, Jakarta, Indonesia.

Abstract

The North Kalimantan Province is a developing area, especially in Desa Pembeliangan, there is no oral health data, economic and education condition still need to be concerned. The aimed of this study is to know the difference of tooth brushing behavior in children aged 5-8-year-old before and after the education given for 21 days. The method was conducted in this research was use quasi-experimental with pretest and posttest design. All data were analysis with Wilcoxon test and Chi-Square test. The result of this study shown that the correlation between plaque score and knowledge, attitudes and actions was significant p=0.000. The correlation between the initial plaque score to the total amount of knowledge, attitudes, and early action was not significant with p=0.909, while after 21 days tooth brushing every day was shown that the significant correlation between plaque score and the total amount of knowledge, attitudes, and the final action with p = 0.041. The significant different of tooth brushing behavior in children aged 5-8-year-old before and after 21 days education was given, by decreasing of plaque score, and increasing on knowledge, attitudes, and actions of all children aged 5-8-year-old.

Clinical article (J Int Dent Med Res 2017; 10(Special Issue): pp. 683-688)

Keywords: Aged 5-8 year-old, plaque score, knowledge, attitude, action.

Received date: 16 August 2017 **Accept date:** 18 September 2017

Introduction

The status of dental and oral health is basically stated in the prevalence of dental caries and periodontal disease because almost all of people around the world suffer from dental caries and periodontal disease. Dental caries not only occur on adults, but it can occur on children. The process of caries growth can take place starting from the eruption of a children's first tooth. Caries is highly related to oral cavity health, moreover on preschool children who don't understand how to brush their teeth well and properly.[1] The existence of dental caries can interfere with general mastication system and it can be a focal infection that interferes with the health and growth of children.[2] Among Aborigine children in West Australia, dental caries occupies the fifth place among the diseases that cause preschool children to be hospitalized.[3]

To avoid dental caries, WHO determines the susceptible age of a person to suffer from dental caries. WHO recommends a certain age group to be examined, namely 5-year-olds for primary teeth. 5-year-olds are a strategic group for dental and oral health countermeasure. 5 years of age is the ideal time to train a children's motoric ability, including brushing teeth. The educational process of dental and oral health is an educational process that occurs based on the need of dental and oral health.[2,4]

The prevalence will grow along with the increase of age. 6-year-olds have suffered from dental caries on 20% of their permanent teeth, increasing into 60% on 8 years of age, 85% on 10 years of age, and 90% on 12 years of age. The increase of prevalence of caries is basically influenced by two factors, called risk factor and modification factor. The factor that directly

Corresponding author:
Risqa Rina Darwita
Department of Dental Public Health and Preventive Dentistry
Faculty of Dentistry, Universitas Indonesia
E-mail: risqarina2004@yahoo.com

causes caries is identified as risk factor. Risk factor consists of oral hygiene, bacteria, saliva, and eating pattern. Modification factor is the factor that indirectly causes caries, but has influence on caries growth. The factor includes age, descendant, sex, social and geographical factor.[2,4]

Currently, the prevalence of dental caries in Indonesia is still high. The data from Riskesdas 2013 indicate that almost 90% of children in Indonesia suffer from dental caries. Caries becomes one of the proofs of non-maintenance of dental and oral condition of Indonesian people. It records that 25.9% has dental and oral problems, the proportion of dental and oral problems in Indonesia in 2013 based on 5-9 years of age group were 28.9%. Indonesian DMF-T index in 2013 was 4.6% that means that tooth decay of Indonesian people was 460 teeth per 100 persons.[1,2]

One of the causes of dental and oral problem on children is behavior or attitude of neglecting dental and oral hygiene. It is caused by the lack of knowledge on the importance of dental and oral health maintenance. Children still rely on adults in terms of maintaining dental and oral health due to the lack of knowledge.

The knowledge on dental and oral health will indirectly lead to behavior of maintaining dental and oral health and finally it can prevent any dental caries. It means that knowledge on dental and oral health can have impact on dental caries occurrence. Parents especially mothers who have less knowledge on dental and oral health will cause less care on their children's tooth condition. The impact of parents' lack of knowledge is the occurrence of dental caries on children.[5]

The report of Basic Health Research (RISKESDAS 2013) in East Kalimantan states that the prevalence of people who have dental and oral problems in 2013 was 24.1%.[1] From the number, only 36.4% of the people who got treatment and care from medical personnel (dental nurse, dentist, or dental specialist), while the other 63.6% did not get any treatment. It can be concluded that the ability of people of East Kalimantan to get a service from dental medical personnel/EMD was only 8.8%. By referring to North Kalimantan that has separated itself from East Kalimantan since 25 October 2012, in this region there has been no data of prevalence of dental and oral disease.[6,7]

Demography data of Pembeliangan Village in 2013/2014 state that the number of 0-3 year-olds was 49 persons and the number of 4-6 year-olds was 289 persons. Besides that, the life expectancy of local people was low, namely in 2012 reached 39 and in 2013 reached 47. From the aspect of health, Pembeliangan Village has 1 main Community Health Center and 2 Pre and Post-Natal Health Care Centers. Based on the data from local Community Health Center, in 2014 there were 3 most severe diseases suffered by outpatients, namely Acute Respiratory Tract Syndrome for 1822 cases, Myalgia for 602 cases, and Gastritis for 556 cases. While for inpatients, Malaria for 14 cases, Acute Gastroenteritis (Diarrhea) for 12 cases, and Acute Gastritis for 10 cases from total 53 treated patients.[8]

This study aimed to analyze the difference of brushing teeth on 5-8 year-olds before and after given education for 21 days in Pembeliangan Village. The expected benefit from this study is to provide information on the effect of education on plaque score of children in Pembeliangan Village, Sebuku Prefecture, North Kalimantan Province.

Research Method

This study used cross sectional design, and use questionnaire for Pretest and Posttest to measure the level of knowledge, attitude, and action of children age 5-8 year-olds, while to examine the level of plaque maturity on children age 5-8 year-olds for 21 days was used dental health status card. The total sampling of all kindergarten students were used as sample. All parent were inform about dental health education, tooth brushing together at school once a week which instructed by the teacher until 21 days. All parents were asked to fill in the inform consent. For the parent of kindergarten student sign in the inform consent, all student were received the clinical oral examination to obtain the def-t score and dental plaque score by 3 persons of young dentist. The dental plaque score were examined every week at once by 3 persons of young dentist. The all of student were given dental health education about how to brush teeth properly, and role play was performed by brushing their teeth all together at school. These three things were conducted for 21 days in order to change their

behavior so they would pay more attention to their oral health. All data were collected and analyzed used statistic soft-ware computer.

Results

This study was conducted in July until August 2015 for 21 days in Pembeliangan village, North Borneo. Data were collected from 85 children. First of all, clinical oral examination was performed in each children to obtain the plaque score, then children were given dental health education about how to brush teeth properly, and role play was performed by brushing their teeth all together. These three things were conducted for 21 days in order to change their behavior so they would pay more attention to their oral health.

Table 1. Distribution of respondents by age

Age (year)	Number of children	%
5	8	9.41
6	15	17.64
7	27	31.77
8	35	41.18
Total	85	100

Table 1 showed that the total respondent were 85 children, but most of the children were 8 years of age which made up 41.18%, while there were few 5 years of age children which only made up 9.41%.

Table 2 showed that most of the respondents' initial plaque score was bad which was 90.6%, but after 21 days the 48% respondents' plaque score following final dental examination was significantly decrease ($p<0.001$).

Table 2. The dental plaque score before intervention compared to dental plaque score after intervention by tooth brushing program in 21 days at school

dental plaque score categorize	Before		After		Significant value (p value)
	children	%	children	%	
Good (0.0-1.0)	3	3.52	41	48	0.001
Moderate (1.1-2.0)	5	5.88	22	26	
Bad (2.1-3.0)	77	90.6	22	26	
Total number	85	100	85	100	

Table 3. The comparison of Knowledge, Attitude, and Practice of children before intervention compared to the Knowledge, Attitude, and Practice of children after intervention

Categorize	Before		After		Significant value (p value)
	Good (%)	Bad (%)	Good (%)	Bad (%)	
Knowledge	71.8	28.2	80	20	0.001
Attitude	32.9	67.1	85.9	14.1	
Practice	1.2	98.8	44.7	55.3	

Table 3 showed that most of the initial good knowledge score was 71.8%, bad attitude was 67.1%, and bad behavior was 98.8%, then there were improvement significantly ($p<0.001$) of the final score of respondents with good knowledge score was 80%, good attitude 80%, mostly behavior was still bad which was 55.3% but there was improvement of good behavior category which was increase significantly ($p<0.001$) from 1.2% to 44.7%.

Table 4. The correlation between dental plaque score with level of Knowledge, Attitude, and Practice (KAP) of children after 21 days intervention by tooth brushing program at school.

Categorize of dental score plaque	Level of Knowledge, Attitude, Practice		Significant value (p value)
	Good	Bad	
Good	28	16	0.041
Bad	17	24	
Total Number children	45	40	85

Table 4 shows that the level of Knowledge, Attitude, Practice of children after 21 days intervention by tooth brushing program was increase significantly ($p<0.05$).

Discussion

Study had been conducted about the role of education in improving the effectiveness of brushing teeth in 5-8 years old children in Desa Pembeliangan, North Borneo. Children were given education about oral health and oral hygiene, knowledge questionnaire, attitude and behavior in maintaining the oral health, clinical oral examination to determine the plaque score, and roleplay by brushing teeth altogether.

The respondents of this study aged 8 years was 41.18% (35 out of 85 children). This is due to the number of children in kindergarten and elementary school in Desa Pembeliangan is extremely low, especially kindergarten in Desa Pembeliangan only had 8 students. 8 years of age in terms of socio-personal development was more capable to socialize, more polite, love competitions and games, and compare themselves to others.

This was the cause that behavior change happened so quickly, because they started to compare their oral hygiene to their peer, they would be embarrassed if they felt that their oral hygiene was bad.

The average plaque score of respondents in initial examination was 2.7 and declined to 1.4. This condition showed that respondents implemented the proper method to brush their teeth after the investigator gave education on how to brush teeth properly for 21 days. This result was comparable to the study which was conducted by Tolvanen et al. (2010), they were successful in decreasing the plaque score after subjects were given education.[9]

The average initial knowledge score in respondents was 8.72 and climbed to 10.13 after receiving education on how to brush teeth properly. This was caused by the number of respondent who were considerably paying attention to the education which was given for 21 days, thus the respondents were more apprehend to the importance of maintaining the oral hygiene. The Wilcoxon test showed that p value was lower than 0.05, which meant that there was significant difference between the initial and final knowledge of respondents. By paying attention to the oral health education which was given by investigator, debriefing process, roleplay of brushing teeth altogether, and evaluation process of plaque score to the respondents further enhanced the comprehension of oral hygiene and oral health in daily life. This result corresponded to the concept strategy of WHO (2012) which aimed to increase the behavior, knowledge, and health status through health education.[10]

Based on the result, the average score of respondents' attitude in initial test was 6.11 and increase to be 8.82. The respondents' attitude could not be separated with improved knowledge process. Respondents who previously did not know became knowing, and then understanding would change the attitude pattern. Respondents behaved better after the investigator gave education for 21 days and knowing that if they did not change their behavior in brushing teeth properly, they would be in risk of having tooth caries. With this good attitude, the number of respondents who behaved well was increasing too. The attitude was a predisposing of action of behavior and was not yet an activity or behavior. The other report study which analyze the impact of

education to the students' of Bulukantil Elementary School, Surakarta washing hands behavior concluded that there was a change of attitude to the students of Bulukantil Elementary School in washing their hands after getting education about healthy life behavior.

Based on this study, it was known that there had been change of behavior of respondents. The average action of respondent, before education about the way and time to brush teeth properly for 21 days, was 8.78 and increased to 9.48. This condition showed that the improving knowledge could affect the attitude to become better. This good attitude was the implemented in respondent oral hygiene maintenance behavior.[6] In addition that behavior is response to action or activity of organism that can be observed and studied which is differentiate in passive and active, passive means that the response occurs inside the human and is not directly visible by other people, such as knowledge, attitude, and perceptions. The respondents' behavior is determinant of health which becomes the target of health promotion and education. In other word, health promotion or education aims to behavior change.

There was a significant correlation between the declining of respondents' final plaque score and the increasing total score level of knowledge, attitude, and behavior. Accordingly, early hypothesis was accepted, which meant that the respondents' final plaque score was meaningfully related to final knowledge, attitude, and action after given education on how to brush teeth properly for 21 days. This study corresponded to a study by Tolvanen et al.(2010), which stated that the decreasing plaque score and improving oral hygiene was observed in test group when compared to control group possibly occurred because of the information that was accepted by the children in educational session and that the information gave contribution to improve their oral hygiene steps.[9]

The behavior change process begins with knowledge function is that the individual has acknowledged the new information and started to learn to understand that new object, it was continued by the confidence which means that individual has already made positive of negative attitude about the new object or information. Then, individual will decide whether or not they will change and the capability of that individual to implement the new behavior according to the health norms.

Behavioral perspective explained that a person would repeat their activity if only the previous similar activity brought in pleasure and satisfaction. The behavioral change in 21 days got reward or reinforcement, which was also called as incentive. Incentive was positive or negative stimulus that could motivate subject. Reinforcement in an activity also influenced the behavior making process in children. The first technique that could be done was how to change the subject's paradigm, which initially thinks to obtain something that the subjects want or enjoy in school, and change it to a condition that to obtain something the subjects want or enjoy, subjects have to show independent behavior without the presence of figure in school, by giving reinforcement when the subjects show independent behavior and not to cry without their mothers by their side. Reinforcement could be a toothbrush, toothpaste, glass, and toy as a form of reward. The objective of this reward is that the children would be motivated to brush their teeth twice daily and reduce the consumption of tooth damaging foods.

Generally, educational activity of brushing teeth using demonstration teaching tools had been done properly, so that the result of the analysis was concordance to the hypothesis that was expressed earlier. This was supported by the behavior change theory "Health Belief Model" and plaque score evaluation.

Conclusion

This study concluded that there was a difference in initial and final assessment of average plaque, knowledge, attitude, and action score after given education on how to brush teeth properly for 21 days in children aged 5-8 years old.

Acknowledgement

This study was granted by community engagement grant from Universitas Indonesia. The publication of this manuscript is supported by Universitas Indonesia.

References

1. Basic Health Research 2013. Indonesian Ministry of Health. Jakarta. 2013.
2. Indonesian Health Profile 2013.Indonesian Ministry of Health. Jakarta; 2014
3. AmericanAcademyofPediatricDentistry.GuidelineonBehaviorGuidanceforthe Pediatric Dental Patient. Pediatr Dent. 2015:37(6):180-193.
4. Richards D. Limited Evidence Available for the Impact of School-Based Behavioural Interventions on Oral Health. Evid Based Dent. 2013;14(2):42-3.
5. Morris J, Marzano M, Dandy N, O'Brien L. Forestry, Sustainable Behaviours and Behaviour Change: Discussion Paper. 2012.
6. Jönsson B, Baker SR, Lindberg P, Oscarson N, Ohrn K.Factors Influencing Oral Hygiene Behaviour and Gingival Outcomes 3 and 12 Months After Initial Periodontal Treatment: An Exploratory Test of an Extended Theory of Reasoned Action.J Clin Periodontol. 2012;39(2):138-44.
7. Satpreet S, Shipra S, Sukhjinder S, Shameena S. Behavioral Change Theories In Health - A Review Article. Indian J Dent Sci. 2013;5(5):121-5.
8. Desa Pembeliangan. Available at: https://pembeliangan.wordpress.com/Accessed: March, 3rd 2015.
9. Hoeft KS. Barker JC. Shiboski S, Pantoja-Guzman E, Hiatt RA. Effectiveness Evaluation of Contra Caries Oral Health Education Program for Improving Spanish-Speaking Parents' Preventive Oral Health Knowledge and Behaviors for Their Young Children. Community Dent Oral Epidemiol. 2016;44(6):564-76.
10. World Health Organization. Health Education: Theoretical Concepts, Effective Strategies and Core Competencies .WHO Library Cataloguing. 2012.