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Dental Health Care Influence on Dental Hygiene of Elementary School Children

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Abstract
Most of Indonesians suffer from dental caries. This is due to bad dental health maintenance. Although in fact, dental caries is a preventable disease. Dental and oral hygiene that is not maintained will cause various dental diseases that will affect general health, although it does not cause death directly, but is also a risk factor for other diseases including: tonsillitis, pharyngitis, otitis media, low birth weight (LBW) , and even heart disease. We undertook this research by evaluating the influence of dental health care towards elementary school children. The subjects are fifth grade in SD Saraswati 4 Denpasar, Indonesia. There are control and intervention groups in this research. The treatment for control group was given leaflet and intervention group was given dental health care with the provision of dental therapist. We evaluate the influence on knowledge, attitude, practice and Debris Index score. The analysis using bivariate test employed Wilcoxon test and univariate test employed Mann-Whitney test. The results show that in intervention group, there is influence of dental health care on knowledge, attitude, practice and Debris Index score of the students. Meanwhile in control group, there is influence on knowledge and attitude but no influence on practice and Debris Index score. Mann-Whitney test shows that there are significant differences in knowledge and attitude, but no significant practice and Debris Index score in intervention and control group. The Debris Index criteria of the intervention group are 100% good with the treatment of dental health care.

Keywords: Dental Health Care, Children, Debris Index, Dental Caries

1. Introduction

One of the components of general health is dental and oral health. Teeth are one of the digestive organs that play an important role in the process of chewing food, so maintaining dental health is important (Al-qahtani, et al. 2020; Ansari & Mahesar, 2017). Many people neglect to even pay attention to the cleanliness of their teeth and mouth, which causes the teeth to become dirty and cause dental and oral diseases. The most common dental disease suffered by almost all Indonesians is dental caries (Zita et al., 2020). According to WHO, dental caries is a pathological process that originates from the outside after the eruption of teeth which results in softening of the hard tissues of the teeth and continues to form a cavity. It is in fact a preventable disease. Dental caries and

periodontal disease are the most commonly suffered disease and are a major dental health problems because of their high prevalence and incidence in the world including Indonesia and their impact on individuals, society and the cost of treatment (World Health Organization (WHO), 2003; Benjamin, 2010).

Dental and oral hygiene that is not maintained will cause various dental diseases that will affect general health, although it does not cause death directly, but is also a risk factor for other diseases including: tonsillitis, pharyngitis, otitis media, low birth weight (LBW) , and even heart disease. Systemic diseases caused by untreated dental caries such as diabetes mellitus can manifest in the mouth. In addition, it will also interfere with the functions and activities in the mouth which will affect the nutritional status and impact on the quality of life. These conditions will have an impact on growth and development and will significantly impact lives of the children. Children who have poor oral health are twelve times more likely to suffer from missing school compared to those who have good oral health (Lewis, et al., 2000; Kwan, et al., 2005). Research conducted in 2010 on primary school students about dental and oral health care services in the Denpasar area showed that the prevalence of dental caries was 62.16%. The Decay, Missing, Filled Teeth (DMF-T) index averages 2.12, which is in line with the national target for 2010, but the evaluation results also show that the level of dental and oral hygiene of elementary school students with OHI-S is still low, because the average is 1.46, while the national target for 2010 is 1.2.

Most of the Indonesians brush their teeth in the morning and evening showers (76.6%). Meanwhile, proper tooth brushing is only 2.3%. The prevalence of brushing teeth at night before going to bed in children in Indonesia is 22.4% and in North Sulawesi is 32.4%. This habit occurs in groups of people who are vulnerable to dental and oral diseases, namely preschool children, elementary school children, expectant mothers, and the elderly. This is due to the lack of behavior in maintaining dental and oral health (Anil & Anand, 2017; Çolak, et al., 2013).

Dental health is a process using a systemic approach in dental health services. In its implementation, there are several aspects or key behaviors. These aspects form a comprehensive unit in the dental nursing process which is the framework for the delivery of quality dental health care services aimed at all clients and the community. The dental health care process which consists of assessment, dental nursing diagnoses, treatment planning, implementation and evaluation, is aimed at providing dental clinical services, which shows that a dental therapist is responsible for identifying and solving problems within the scope of practice of dental health care services (Prasad et al., 2019).

SD Saraswati 4 Denpasar or Saraswati 4 Elementary School Denpasar, is one of the private schools in Denpasar City. Based on interviews with teachers and students, the elementary school has never received counseling on dental and oral health and only received dental health checks by the Denpasar Selatan 3 Public Health Center, this is due to the limited staff available.

Our research aimed to understand the influence of dental health care towards oral hygiene status of the students in SD Saraswati 4 Denpasar, one of the elementary schools in the working area of Public Health Service III of South Denpasar, Indonesia.

2. Method

This research was performed in 2019. We conducted this research in Quasi-experiment with pre – test and post – test control group design. The groups are divided into two, i.e., intervention group and control group. The variables are knowledge, attitude, practice and Debris Index. Intervention group was given dental health care provision with the therapist. Meanwhile the control group was given leaflet on how to perform tooth brushing. After the treatments, the post – test was conducted to compare the influence of the treatments.

2.1 Participant

The population in this research is elementary school students in SD Saraswati 4, Denpasar grade V. The selection of fifth grade students as the research population is for the preparation of their future dental health. So it is expected that fifth grade students already have the knowledge and skills on how to maintain and prevent dental and oral

diseases. Class A is as intervention group with 38 students and class B with 37 students is as control group. The sample was chosen in purposive sampling.

The inclusion criteria were the students of fifth grade with average age of 10 – 12 and willing to follow every step of the research and signed the informed consent. Meanwhile the exclusion criteria were the students of fifth grade having no complete data (age, gender, score of practice and Debris Index).

2.2 Operational Definition

There are three variables used in this research. The independent variable is dental health care, the dependent variable is Debris Index score and the intervening variables are knowledge, attitude, and practice of dental hygiene.

2.3 Instruments

We performed this research qualitatively using questionnaire, diagnostic set, and examination sheet. The instruments are grouped into questionnaire with personal data such as name, age, address and gender. The questionnaire was used for measuring the score of knowledge, attitude and practice. The diagnostic test was used to examine Debris Index and it was recorded in examination sheet. We also gave tooth brushing kit to the respondents.

2.4 Implementation

In order to obtain the score of knowledge, attitude and Debris Index, pre – test was conducted to intervention and control group without any treatment. Afterwards, they were given different treatments, i.e. leaflet to control group, dental health care to intervention group. Then, the post – test was conducted to evaluate the changes from previous pre – test data. The Debris Index was also evaluated in the end of the research, i.e. in fourth week and it is compared to first week.

2.5 Data Processing and Analysis

The data was processed into narration and table which was processed using SPSS 25. The analysis employs univariate and bivariate analysis. Univariate analysis was conducted to provide a general description of the variables:, knowledge, attitudes, practice and debris Index of elementary school students is presented in the form of frequency distribution tables and percentages.

In the intervention group and the control group before analyzing the differences in knowledge, attitudes, practice, and debris index before and after the intervention, a normality test of the data was carried out first to determine the different test to be used. In the data normality test, because the data obtained are not normally distributed in the Kolmogorov Smirnov one sample statistical test, namely with a p value <0.05, the paired simple T-Test analysis is replaced with a non-parametric Wilcoxon Test.

Normality test was also done to evaluate the analysis test to use. The normality test was done to the difference of score of pre – test and post – test both in the control group and the intervention group. The results of the data normality test with the one sample Kolmogorov Smirnov test found that the data on the average difference in knowledge, attitude, practice and plaque index were not normally distributed, namely with $p < 0.05$, then the independent sample T-Test was replaced with the non-parametric Mann-Whitney Test.

3. Results

The sample selected was class V SD Saraswati 4 Denpasar with class 5A totaling 38 students as the intervention group and class 5B students totaling 37 students as the control group. Pre-test and post-test were administered to see the frequency and percentage of the intervention and control groups on the level of knowledge, attitudes and actions on dental hygiene. Pre-test is done before the treatment was undertaken. After that, the intervention group was given dental health care and the control group was given leaflets.

3.1 Frequency Distribution

The results of students' knowledge in maintaining oral and dental hygiene are shown in Table 1. The qualifications for knowledge, attitude and practice are defined as excellent criteria, namely if the score obtained is 80 - 100, good if the score obtained is 70 - 79, the criteria is fair if the score obtained is 60 - 69 and poor if the score obtained is less than 60.

Table 1: Distribution Based on Student Knowledge in Maintaining Dental and Oral Health in the Control and Intervention Group

Criteria	Control Group				Intervention Group			
	Pre-test		Post – test		Pre-test		Post – test	
	n	%	n	%	n	%	n	%
Excellent	24	64.9	26	70.3	8	21	27	71.1
Good	8	21.6	7	18.9	7	18	9	23.7
Fair	5	13.5	4	10.8	17	45	2	5.3
Poor	0	0	0	0	6	16	0	0
Total	37	100	37	100	38	100	38	100

Table 2 shows the measurement of students' attitudes in maintaining oral health in the control and intervention groups.

Table 2: Distribution Based on Student Attitude in Maintaining Dental and Oral Health in the Control and Intervention Group

Criteria	Control Group				Intervention Group			
	Pre-test		Post – test		Pre-test		Post – test	
	n	%	n	%	n	%	n	%
Excellent	32	86.5	35	94.6	25	65.8	36	94.7
Good	5	13.5	2	5.4	8	21.1	1	2.6
Fair	0	0	0	0	5	13.2	1	2.6
Poor	0	0	0	0	0	0	0	0
Total	37	100	37	100	38	100	38	100

Table 3 shows the measurement of students' practice in maintaining oral health in the control and intervention groups.

Table 3: Distribution Based on Student Practice in Maintaining Dental and Oral Health in the Control and Intervention Group

Criteria	Control Group				Intervention Group			
	Pre-test		Post – test		Pre-test		Post – test	
	n	%	n	%	n	%	n	%
Excellent	36	97.3	36	97.3	34	89.5	38	100
Good	1	2.7	1	2.7	4	10.5	0	0
Fair	0	0	0	0	0	0	0	0
Poor	0	0	0	0	0	0	0	0
Total	37	100	37	100	38	100	38	100

Table 4 shows the measurement of students' Debris Index in maintaining oral health in the control and intervention groups.

Table 4: Distribution Based on Debris Index Score in the Control and Intervention Group

Criteria	Control Group				Intervention Group			
	Week 1		Week 4		Week 1		Week 4	
	n	%	n	%	n	%	n	%
Good	0	0	0	0	0	0	38	100
Fair	11	29.7	12	32.4	36	94.7	0	0
Poor	26	70.3	25	67.6	2	5.3	0	0
Total	37	100	37	100	38	100	38	100

Debris Index in good criteria is when the value of examination is between 0 – 0.6, fair with 0.7 – 1.8 and poor if the score of examination is 1.9 – 3.0 (Wei & Lang, 1982). In the control group, most of results show poor criteria, while in intervention group, there is a change from week 1 in fair criteria to all good criteria (100%).

3.2. Bivariate Analysis

Before performing the bivariate analysis, the data normality test was carried out first. Based on data on knowledge, attitudes, practice and Debris Index.

Table 5: Normality Test of Bivariate Analysis

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest_knowledge_control	.176	37	.005	.918	37	.010
Posttest_ knowledge_control	.219	37	.000	.904	37	.004
Pretest_attitude_control	.176	37	.005	.912	37	.007
Posttest_ attitude_control	.188	37	.002	.893	37	.002
Pretest_practice_control	.439	37	.000	.464	37	.000
Posttest_ practice_control	.434	37	.000	.449	37	.000
Pretest_DI_control	.362	37	.000	.764	37	.000
Posttest_DI_control	.344	37	.000	.784	37	.000
Pretest_knowledge_intervention	.236	37	.000	.888	37	.001
Posttest_ knowledge_intervention	.282	37	.000	.847	37	.000
Pretest_attitude_intervention	.196	37	.001	.888	37	.001
Posttest_ attitude_intervention	.270	37	.000	.811	37	.000
Pretest_practice_intervention	.205	37	.000	.871	37	.000
Posttest_ practice_intervention	.469	37	.000	.533	37	.000
Pretest_DI_intervention	.355	37	.000	.707	37	.000
Posttest_DI_intervention	.534	37	.000	.307	37	.000

a. Lilliefors Significance Correction

The significance value of the Kolmogorov-Smirnov test showed an overall $p < 0.05$, so that based on the results of the Kolmogorov-Smirnov normality test, the data were not normally distributed. Then, the significance value of the Shapiro-Wilk test showed $p < 0.05$ so that based on the Shapiro-Wilk normality test, the data was not normally distributed.

Table 5 shows that the data were not normally distributed, so the Wilcoxon test was used. The analysis is used to see the increase in knowledge, attitudes, practice and the Debris Index. The second analysis is an analysis to determine the differences in the value of knowledge, attitudes, practice and the value of the Debris Index in the control group receiving leaflets and the intervention receiving dental health care using the Mann Whitney test because the data is not normally distributed.

Table 6: Wilcoxon Test Results

	Knowledge		Attitude		Practice		Debris Index	
	p-value	Interpre-tation	p-value	Interpre-tation	p-value	Interpre-tation	p-value	Interpretation
Intervention group	.014	There is influence	.000	There is influence	.000	There is influence	.000	There is influence
Control group	.014	There is influence	.017	There is influence	.334	No influence	.171	No influence

Table 6 shows the results of Wilcoxon test to knowledge, attitude, practice and Debris Index score. The results reveal that in the intervention group, the dental health care given has influence to knowledge, attitude, and practice of maintaining dental and oral health and also influence on Debris Index score. Meanwhile in the control group,

the leaflet only gives influence on knowledge and attitude of maintaining oral health, and no influence to practice also Debris Index score.

3.1 Univariate Analysis

The next analysis is to compare the difference between pre-test and post-test on knowledge, attitudes, practice and Debris Index. Before performing the univariate analysis, the data normality test was carried out first. The significance value of the Kolmogorov-Smirnov test showed an overall $p < 0.05$, so that based on the results of the Kolmogorov-Smirnov normality test, the data were not normally distributed. Then, the significance value of the Shapiro-Wilk test showed $p < 0.05$ so that based on the Shapiro-Wilk normality test, the data was not normally distributed. The results of the normality test showed that the data were not normally distributed, so the non-parametric Mann-Whitney Test was used. The analysis was used to compare the difference in the value of knowledge, attitudes, practice and Debris Index before and after treatment between the control group and the intervention group.

Table 7: Mann-Whitney Test Results

	Knowledge		Attitude		Practice		Debris Index	
	p-value	Interpretation	p-value	Interpretation	p-value	Interpretation	p-value	IInterpretation
Intervention group – control group	.000	There is a significant difference	.011	There is a significant difference	.202	No significant difference	.000	There is a significant difference

Table 7 shows the results of Mann-Whitney test in which the difference value of intervention group and control group on knowledge, attitude, practice and Debris Index shows various results. On knowledge, there is a significant difference with p – value 0.000. The same result is shown in attitude where the p – value is 0.011, so it concludes that there is a significant difference on attitude. Meanwhile in practice, there is no significant difference with p – value of 0.202 and in Debris Index, there is a significant difference shown by p – value of 0.000.

4. Discussion

The results of the Wilcoxon statistical test on the level of knowledge showed that in the control group, there is an effect of leaflets on knowledge of maintaining dental health. The same result occurred in the intervention group where there is an effect of dental health care on the level of knowledge with a p-value of 0.014. Taking a look at the results of the Mann-Whitney test, the difference in knowledge scores between the pre-test and post-test in the intervention group and the control group turns out that although they have the same effect, there is a significant difference in the difference in the knowledge value of the intervention and control groups. Dental health care has been proven to have an effect on the knowledge of school-age children (Saffan et al., 2017). However, basically dental health care, if it is only in the form of written information without any care action, it will only have a short-term effect (Igić, et al., 2008;Veiga, et al., 2015). The extension program should be carried out in accordance with an active learning process between the child and the dental therapist.

The role of a dental therapist or dentist is very important for children in preventing dental disease from an early age. This is because based on the results of research by Davidovi, et al., (2014) It was found that although children have excellent knowledge about dental health maintenance, the relationship between knowledge and practice may result in contradictory conclusions. Therefore, knowledge and control on the implementation of dental health must be carried out simultaneously. As in this study, it can be seen that although the knowledge value in the control group is in accordance with Table 1 in the pre-test and post-test, it is consistently in excellent criteria, namely 64.9% pre-test and 70.3% in post-test, and there is an effect of leaflets on knowledge that was proven by the Wilcoxon test which resulted in a p-value of 0.014, but on the results of the practice, it was seen that there is no effect of giving leaflets on changes in dental health maintenance practice in the control group. This is due to the fact that leaflets are one-way information and there is no active interaction between students and dental therapists, as was done in the intervention group. Meanwhile, in the intervention group, it implies that the intervention group

experienced an increase in the percentage of knowledge from fair criteria (45%) to excellent (71.1%). It is proven that in the intervention group, the Wilcoxon test results obtained a p value of 0.000 which means that there is an effect of dental health care on dental health maintenance actions in the intervention group. Assistance in maintaining dental health has proven to be effective under the supervision of doctors, teachers and peers. It is evident that the peer strategy is as effective as a dentist supervision strategy than the teacher and self-study strategy to improve dental hygiene behaviors (Haleem, et al., 2012). This research proves that mentoring for students by dental health personnel has a positive and effective impact on improving student behavior in improving dental and oral health. Meanwhile, in terms of peer strategy, this can produce effective outcomes if the peer also has the right dental health behavior. This can be done by providing assistance to students so that slowly other students will follow the behavior of maintaining dental health fully and consciously, because by seeing, listening and interacting, students will be able to respond to what they get and manifest it in practice or action (Apesteguia, Huck, Oechssler, Weidenholzer, & Weidenholzer, 2018). Research by Abullais, et al., (2020) and Ahamed et al., (2015) said that adherence was also influenced by gender where adherence to dental health maintenance of female participants was better than that of male participants.

Practice on dental health maintenance in the intervention and control groups experienced differences where in the intervention group, the provision of dental health care gives an effect on dental health maintenance practice with a p-value of 0.000 while in the control group, there is no effect on dental health maintenance practice even though leaflets were given to the control group. This is evidenced by the p-value of the control group of 0.171. Basically, the act of maintaining dental health is influenced by several factors, such as the habit of maintaining dental health at home with parents (Neupaul & Mahomed, 2020), age, access to public health services (Medina-Solís, et al., 2006; Afeef, et al., 2021) and social economy status (Elamin, et al., 2021).

Aspects of practice can be increased if the aspects of knowledge, attitudes and practice in children are in harmony. In addition, the effectiveness of dental health care can be increased if the dental health program is adapted to the needs of respondents, especially school children so that in practice it can last for a long time (Blaggana, et al., 2016). In addition, good knowledge and good attitudes towards dental health care do not always result in good actions or practices. This is evidenced by Sogi et al., (2016) that the average percentage of knowledge on dental health is 69.5%, and attitude is 53.5%. However, in practice only 33.5% have good dental health maintenance practices. In correlation to this study, although the control group had an effect on knowledge and attitudes towards the treatment of giving leaflets, there is no significant effect on the practice because the results in the practice according to table 3 had the same number so that the leaflet administration did not change the dental health maintenance practice. This can be motivated by the habit of brushing teeth before this research.

The final results on knowledge, attitudes and practice can ultimately be seen in the Debris Index value. If the maintenance of the teeth is good, then the resulting Debris Index is also in good criteria. The Debris Index in the intervention group has a p - value of 0.000 so that there is an effect of dental care on the Debris Index value, while in the control group, there is no effect, seen from the p - value 0.171. This is reinforced by the Mann-Whitney test where the difference in the pre-test and post-test scores on the Debris Index, namely in the first week and fourth week, has a significant difference with a p-value of 0.000. Dental health care is proven to have an impact on the effect of the Debris Index value where the intervention group was given dental health care experienced an increase in status to 100% good at the fourth week. While in the control group, none of them are in the good criteria, on the contrary in the control group, the Debris Index value in the fourth week remained on the poor criteria, namely 67.6% of students. This is of course seen from the treatment of the two groups where the control group only received leaflets while the intervention group received dental health care. This difference in treatment turned out to have a significant effect on the value of the Debris Index. This is evidenced by the Wilcoxon test which shows a p - value of 0.000 in the intervention group which means that there is an effect of dental health care on the Debris Index value, while in the control group, it has a p - value of 0.171 and means that there is no effect of leaflets on the Debris Index value.

5. Conclusion

We have undertaken a research of dental health care to elementary school students. It can be concluded that there is an effect of dental health care on improving Oral Hygiene of SD Saraswati 4 Denpasar. In addition, there are

differences in the level of knowledge about dental health before and after being given dental health care in the intervention group and leaflets in the control group with Wilcoxon test results p - value 0.014 both in the intervention and control groups. The same thing happened to the attitude of maintaining dental health where both leaflets and dental health care has an effect on the attitude of maintaining dental health as evidenced by the p-value in the intervention group of 0.000 and the control group 0.017.

Meanwhile, in dental health maintenance, only the intervention group with dental health care treatment has an effect on dental health maintenance with a p-value of 0.000 and in the control group there is no effect with a p-value of 0.171. The same conclusion occurred in the Debris Index where only the intervention group with dental health care has an effect on the change in the Debris Index from 97.4% to 100% entirely on the good criteria. While in the control group there is no effect on the value of the Debris Index where the status of the Debris Index in the control group remained at the criteria of less than 67.6%.

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