**Educational Effectiveness Using Paint Application Media on Knowledge About Dental Health Care in Elementary School Students**

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**Abstract**

The prevalence of caries in school-age children is still high due to inadequate maintenance of dental health. Dental health maintenance education is one of the efforts to achieve optimal dental health status. Education using paint application media is interactive so that it can increase children's understanding and motivation in receiving educational material whose goal is so that children are willing and able to be independent in carrying out dental health maintenance. This type of research is a quasi-experimental design with a pre-post test with control group design. The number of respondents was 60 elementary school students aged 8-10 years. Data analysis used paired t-test. The results of data analysis showed that there was an effect of providing education using paint application media on knowledge about maintaining dental health in elementary school students (p=0.000).

Keywords: Education, Paint Application, Maintenance of dental health

**Introduction**

Health development aims to increase awareness and ability to live a healthy life for everyone in order to realize an optimal degree of health including physical, mental and social health. To realize this, an approach is taken with efforts to maintain and improve health (promotive), disease prevention (preventive) and disease treatment (curative) which are carried out thoroughly and continuously.1

The degree of optimal health is one of the factors that influence the improvement of the quality of human resources. Healthy school-aged children are an asset for creating better human resources as the nation's next generation. Dental and oral health is a component of general health which plays an important role in the functions of mastication, speech and beauty. These three functions are very important in supporting the growth and development of children.

The prevalence of dental and oral diseases, especially dental caries, is still high in school-age children. 2,3,4,5 The results of the 2018 Basic Health Research (Riskesdas) show that the prevalence of caries in early childhood is around 93%. 6 Federation Dental International (FDI) and WHO targets 5 to 6 years of age at least 50% to be free from dental caries in every country. Therefore, it is necessary to make maximum efforts to prevent caries from an early age.7

Dental health problems experienced by school children can disrupt learning activities which have an impact on decreased academic achievement and psychosocial problems. 8,9,10 Elementary school children are more susceptible to caries because in general they really like sweet food and drinks11,12 besides that children's awareness to always maintain oral hygiene is still lacking.13,14

Dental health problems can be prevented through dental health education approaches. 15,16 Health education is an effort made to increase individual health knowledge regarding the management of disease risk factors and healthy living behaviors to improve health status, prevent disease and recover from disease. Implementation of education, activities are carried out in a planned manner with the aim of being able to influence other people, whether individuals, groups, or communities so that they carry out message information expected by educators. 17 Health education can be carried out using media that functions to assist in the educational process. Digital media penetrates everyday life, including at the age of children and adolescents, with interpretations that follow positive patterns that become innovations in the educational world.18

Education for elementary school children is carried out to increase knowledge of dental health maintenance as an effort to reduce the risk factors for dental caries. Education using paint application media is more effective and interactive because it fosters attention, interest and gets direct feedback from children. Especially since the conditions of the COVID 19 pandemic, online learning has also been carried out for elementary school children so that children are used to using laptops as learning media.

To support the successful implementation of education, delivery of health messages to children can be done using the peer education method. Based on the research that has been carried out, education using the peer education method is carried out through interaction and observation of other people to influence individual behavior, as well as by sharing experiences and learning between people of the same age, environment, and culture. 19 As an effort to achieve optimal dental health degrees in children are carried out educational development provided by peers using the interactive media Paint Application.

**Methods**

This type of research was a quasi-experimental design with pre-test and post-test design. The research was carried out at YPK Don Bosco Elementary School, Percut Sei Tuan. This type of research was a quasi-experimental design with pre-test and post-test designs. The sample was elementary school students, aged 8–10 years. The number of samples was 60 elementry school. Sample selection was simple random sampling.

**Measurement and data collection**

Data were collected by dividing the sample into two groups, namely, the case group (n = 30 people) and the control group (n = 30 people). This type of research is a quasi experiment with a pre-post test design with a control group design. The research was conducted in two locations, the number of respondents was 60 elementary school students aged 8-10 years.

Data collection begun with distributing questionnaires to students to get initial data on knowledge about dental health maintenance (pre-test). Furthermore, in the case group, research assisted by peers group conducted education on dental health maintenance using paint application media. Each child colored the pictures that have been provided in the paint application according to the group of pictures, namely, the introduction of healthy teeth and caries, foods that are healthy for teeth and not healthy for teeth, as well as the importance of brushing teeth and regular check-ups with the dentist. After completion of the intervention, the questionnaire was administered again (as a post-test). Furthermore, direct dental health checks were carried out on students to obtain data on def-t and DMF-T.

**Data analysis**

The collected data were analyzed using univariate analysis to determine the frequency distribution of knowledge frequency. To determine the effect of education using paint applications on increasing knowledge about dental care in students, the knowledge before and after the intervention using paint applications was compared and analyzed using the paired t-test.

**Results**

The increase in respondents' knowledge before and after the intervention using the paint application was seen from the predetermined categories.

Table 1. Distribution of Knowledge Frequency of Students at SD YPK Don Bosco Percut Sei Tuan and SD YPK Don Bosco Saribu Dolok

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Category | Case | | | | | | Control | | | | | |
| Before | | | After | | | Before | | | After | | |
| n | | % | n | | % | n | | % | n | | % |
| 1st Year  Percut Sei Tuan | | | | | | | | | | | | |
| Poor | 17 | 56,7 | | 0 | 0,0 | | 16 | 53,3 | | 0 | 0,0 | |
| Moderate | 13 | 43,3 | | 2 | 6,7 | | 14 | 46,7 | | 4 | 13,3 | |
| Good | 0 | 0,0 | | 28 | 93,3 | | 0 | 0,0 | | 26 | 86,7 | |
| Total | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | |
| 2nd Year |  |  | |  |  | |  |  | |  |  | |
| Poor | 19 | 63,3 | | 0 | 0,0 | | 16 | 53,3 | | 1 | 3,3 | |
| Moderate | 9 | 30,0 | | 4 | 13,3 | | 13 | 43,3 | | 12 | 40,0 | |
| Good | 2 | 6,7 | | 26 | 86,7 | | 1 | 3,3 | | 17 | 56,7 | |
| 1st Year  Saribu Dolok |  |  | |  |  | |  |  | |  |  | |
| Poor | 15 | 50,0 | | 0 | 0,0 | | 13 | 43,3 | | 0 | 0,0 | |
| Moderate | 15 | 50,0 | | 0 | 0,0 | | 16 | 53,3 | | 2 | 6,7 | |
| Good | 0 | 0,0 | | 30 | 100,0 | | 1 | 3,3 | | 28 | 93,3 | |
| Total | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | |
|  | Case | | | |  | | Control | | | | | |
| Before | | | After | | | Before | | | After | | |
| n | % | | n | % | | n | % | | n | % | |
| 2nd Year |  |  | |  |  | |  |  | |  |  | |
| Poor | 18 | 60,0 | | 0 | 0,0 | | 14 | 46,7 | | 0 | 0,0 | |
| Moderate | 11 | 36,7 | | 1 | 3,3 | | 14 | 46,7 | | 8 | 26,7 | |
| Good | 1 | 3,3 | | 29 | 96,7 | | 2 | 6,7 | | 22 | 73,3 | |
| Total | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | | 30 | 100,0 | |

Based on Table 1, it shows that there was an increase in knowledge after the intervention using the paint application in year 1 and year 2 at both locations.

The results of the def-t and DMF-T examinations can be seen in Table 2 below:

Table 2 Frequency Distribution of Dental Conditions among Students at SD YPK Don Bosco Percut Sei Tuan and SD YPK Don Bosco Saribu Dolok

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| def-T | | | | | | | | | | | |
| 1st Year | Percut Sei Tuan | | | | | | | Saribu Dolok | | | |
|  | d | e | | f | | | def-t | d | e | f | def-t |
| Jumlah | 66 | 42 | | 16 | | | 124 | 54 | 40 | 13 | 107 |
| def-t index | 2,07 | | | | | | | 1,78 | | | |
| 2nd Year | Percut Sei Tuan | | | | | | | Saribu Dolok | | | |
|  | d | e | | | f | def-T | | d | e | f | def-T |
|  | 46 | 27 | | | 37 | 110 | | 36 | 25 | 44 | 105 |
| def-t index | 1,83 | | | | | | | 1,75 | | | |
| DMF-T | | | | | | | | | | | |
| 1st Year | Percut Sei Tuan | | | | | | | Saribu Dolok | | | |
|  | D | M | | F | | | DMF-T | D | M | F | DMF-T |
| Total | 66 | 37 | | 16 | | | 119 | 54 | 31 | 13 | 98 |
| DMF-T index | 1,98 | | | | | | | 1,63 | | | |
| 2nd Year | Percut Sei Tuan | | | | | | | Saribu Dolok | | | |
|  | D | | M | F | | | DMF-T | D | M | F | DMF-T |
| Total | 17 | | 37 | 65 | | | 119 | 12 | 31 | 55 | 98 |
| DMF-T index | 1,98 | | | | | | | 1,63 | | | |

Based on Table 2, it can be seen that in the second year there was a decrease in the average def-T of students in Percut Sei Tuan and Saribu Dolok while the average DMF-T remained but there was a dominant change in the values ​​of Decay and Filling.

**Bivariate Analysis**

To find out the effect of education using the paint application on increasing dental care knowledge in students, knowledge was compared before and after the intervention using the paint application and analyzed using the paired t test. Differences in respondents' knowledge can be seen in Table 3 below.

Table 3 Differences in Respondents' Knowledge Before and After Education

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | | Mean | SD | Mean Difference | p |
| Percut Sei Tuan | Before | 5,10 | 1,213 | 3,53 | 0,000 |
| After | 8,63 | 0,964 |
| Saribu Dolok | Before | 5,20 | 1,297 | 3,77 | 0,000 |
| After | 8,97 | 0,890 |

Based on Table 3 it is known that after education using the paint application there was an increase in respondents' knowledge of 3.53 for SD YPK Don Bosco Percut Sei Tuan students and 3.77 for SD YPK Don Bosco Saribu Dolok students. Based on the paired t test, it is known that the value of p (0.000) < α (0.05) so that education using the paint application has an effect on increasing students' knowledge in maintaining dental health.

Differences in Knowledge of Dental Health Care Before and After Intervention Using the Paint Application and Image Coloring Art

Table 4 Differences in Knowledge of Students in Maintaining Dental Health by Using the Paint Application and the Art of Coloring Pictures at SD YPK Don Bosco Percut Sei Tuan and Saribu Dolok

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Location | Group | Knowledge | SD | Mean diff. | t | p |
| Percut Sei Tuan | | | | | | | |
| Before intervention | Case | 5,10 | 1,213 | 0,17 | 0,517 | 0,607 |
| Control | 5,27 | 1,285 |
| After  intervention | Paint Appl. | 8,63 | 0,964 | 0,87 | 3,006 | 0,004 |
| Coloring Picture | 7,77 | 1,251 |
| Mean | Paint Appl. | 3,53 | 1,137 | 1,03 | 3,128 | 0,003 |
| Coloring Picture | 2,50 | 1,408 |
| Saribu Dolok | | | | | | | |
| Before intervention | Paint Appl. | 5,20 | 1,297 | 0,20 | 0,553 | 0,583 |
| Coloring Picture | 5,40 | 1,499 |
| After intervention | Paint Appl. | 8,97 | 0,890 | 0,93 | 0,380 | 0,000 |
| Coloring Picture | 8,03 | 0,999 |
| Mean | Paint Appl. | 3,77 | 1,165 | 1,13 | 2,884 | 0,005 |
| Coloring Picture | 2,63 | 1,810 |

Based on Table 4 it is known that before the intervention using the paint application and coloring pictures, it is known that the p value (0.607) > α (0.05) which means that there is no real difference in the knowledge of respondents in the two groups before the intervention, after the intervention it is known that the p value (0.004) < α (0.05) which means that there is a difference in the knowledge of the respondents in the two groups after the intervention.

The difference in the average increase in knowledge in the group that was intervened using the paint application was 1.03 higher than the group that was intervened with the art of coloring pictures with an average value of increasing knowledge of 0.003 <α (0.05) which means that there was a difference in the increase in the knowledge of respondents in both group after the intervention.

**Discussion**

The health of children needs attention so that they can learn, grow and develop into quality human resources. The ability to live healthy can be done if you have good knowledge about healthy living, one example is knowledge about maintaining dental health. In this study, knowledge was measured based on the results of filling out a questionnaire about maintaining dental health. Questionnaires were distributed to 120 students located in two schools (each location consisted of 60 people) whose intervention was divided into 2 groups, namely 30 people per each location received intervention using the paint application and 30 other people as a control group with coloring pictures.

Based on the results of the study it was found that there was no significant difference between the knowledge of students of SD YPK Don Bosco Saribu Dolok and students of SD YPK Don Bosco Percut Sei Tuan, where before the intervention using the paint application had a knowledge value of 5.10 at SD YPK Don Bosco Percut Sei Tuan and 5.20 at SD YPK Don Bosco Saribu Dolok. Likewise in the control group, where YPK Don Bosco Percut Sei Tuan Elementary students had a knowledge of 5.27 and YPK Don Bosco Saribu Dolok Elementary students had a knowledge of 5.40. Before conducting experimental research, it is better if the group conditions have comparable or balanced abilities in order to avoid bias. Bias can occur in an experimental study. Research bias consists of selection bias and information bias so that a balance between the abilities of the research subjects is needed.

According to WHO, one of the strategies for acquiring knowledge is by providing information so as to raise awareness which in the end will have attitudes and actions that are in accordance with their knowledge. Communities need to be given information about dental health using various methods and media. The educational method is a learning process that aims to develop children's potential to be better. Educational media is increasingly developing according to the times by using computer technology.

Based on the results of the study, it was known that before the intervention using the paint application and the art of coloring pictures in both locations, the majority had poor knowledge with a total of 19 people (63.3%) in the intervention group using the paint application at SD YPK Don Bosco Percut Sei Tuan, 16 people (53.3%) in the intervention group with paint application and the art group coloring pictures at SD YPK Don Bosco Percut Sei Tuan, 18 people (60.0%) in the intervention group using applications at SD YPK Don Bosco Saribu Dolok and 14 people (46 .7%) in the control group at SD YPK Don Bosco Saribu Dolok. After the intervention, most of the respondents had good knowledge (86.7%) in the intervention group using an application at SD YPK Don Bosco Percut Sei Tuan, 17 people (56.7) in the intervention group used the art of coloring pictures at SD YPK Don Bosco Percut Sei Tuan , 29 people (96.7%) in the intervention group used the paint application at SD YPK Don Bosco Saribu Dolok and 22 people (73.3%) in the group with coloring intervention at SD YPK Don Bosco Saribu Dolok.

Based on the results of the study it was found that after education using the paint application there was an increase in respondents' knowledge of 3.53 for YPK Don Bosco Percut Sei Tuan Elementary students and 3.77 for YPK Don Bosco Saribu Dolok Elementary students. Based on the paired t test, it is known that the value of p (0.000) < α (0.05) so that education using the paint application has an effect on increasing students' knowledge in maintaining dental health.

In the second year, the intervention is carried out by peers so that other students understand the information provided. The peer approach becomes an attraction for students to follow the material presented by their friends. Peer education is an educative approach strategy to produce individual behavior needed in order to improve and maintain health. 20,21,22 In peer groups, individuals feel that they have similarities with one another such as age, needs and goals that can be strengthen the group. 23 Interventions carried out to increase student knowledge are efforts to provide learning experiences or create conditions for individuals, families, groups and communities, by opening lines of communication, providing information and conducting education to increase knowledge, attitudes and behavior through approaches leadership (advocacy), building atmosphere (social support) and community empowerment.

The results of Ismiyanti's research (2014) stated that health education with peer educators in grades V and VI students of SD Negeri I Kasihan Ngentakrejo Lendah Kulon Progo was able to increase knowledge about Clean and Healthy Behavior (PHBS). Rachmaniyati (2017) from the results of his research also revealed that there was an effect of health education by peer educators on PHBS. The peer educator method can provide an accurate role model for their peers.

The difference in the average increase in knowledge in the group that was intervened using the paint application was 1.03 higher than the control group with an average value of increased knowledge of 0.003 <α (0.05) which means that there was a difference in the increase in the knowledge of respondents in the two groups after the intervention . The difference in the average increase in knowledge in the group that was intervened using the paint application was 1.13 higher than the art coloring group with a mean increase in knowledge of 0.005 <α (0.05) which means that there was a real difference in the increase in the knowledge of respondents in both group after intervention at SD YPK Don Bosco Percut Saribu Dolok.

Based on the research results, it is known that education using paint applications is more effective than using the art of coloring pictures. Currently, children are used to using similar computer technology, especially during the Covid-19 pandemic. Children's passion for using computer technology can be utilized by using the paint application in drawing. Today's children are born in the digital world and can also be referred to as digital natives. 24 Children can be creative according to their imagination so that they will remember what they have done better.25

Dental and oral health education for children is essentially to introduce children to dental health and all dental health problems so that they are able to maintain dental health, train children to clean their teeth according to their abilities, and get good cooperation when they need treatment for their teeth. Based on data from examination of dental caries status, when compared with the results of the first year's study (2021) it is known that the average def-T value in Percut Sei Tuan and in Saribu Dolok has decreased. For DMF-T, there was no change in the second year, but based on the number of caries, it decreased.

**Conclusion**

1. There was a change in the value of def-T and DMF-T for the better in the second year at both locations

2. After education using the paint application by assist peer group there was an increase in respondents' knowledge of 3.53 for SD YPK Don Bosco Percut Sei Tuan students and 3.77 for SD YPK Don Bosco Saribu Dolok students. Based on the paired t test it is known that the value of p (0.000) < α (0.05) so that education using the paint application is effective in increasing students' knowledge in maintaining dental health.

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