



## The Effect of Health Promotion with Pop-Up Book Media on Elementary School Students' Knowledge and Practice of Dental Caries Prevention

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### Abstract

Caries or cavities and gum problems are the most common oral diseases in children. As many as 89% of children in Indonesia under the age of 12 suffer from oral diseases. Learning about dental health in children has received less attention, and one of the causes is the method used so far is still with lectures, children are less interested and feel bored, so learning outcomes are not optimal. This study aims to analyze the effect of dental health promotion using Pop Up Book media on knowledge and practice of preventing dental caries in elementary school students. This study used a quasi-experiment with two groups consisting of one experimental group and one control group. The results of the study on the knowledge and practice of preventing dental caries of students with Pop Up Book media for the pre test and post test showed positive students experienced an increase in student practice by using Pop Up Book media from the pre test value to the post test value. So it can be concluded that there is an effect of Pop Up Book media on students' knowledge and practice of brushing teeth in an effort to prevent dental caries.

## Introduction

Dental and oral problems in children can occur one way or another due to negligence in maintaining dental and oral hygiene. Up to 89% of Indonesian children under the age of 12 suffer from dental and oral diseases (Nurhidayat, 2012). Damage to hard tooth tissue due to caries, if it is too long, will damage the pulp tissue, causing necrosis or death of the pulp. If the infection spreads, it can continue to the periapical tissue and cause an abscess or swelling of the periapical tissue (Wirda, 2018).

Based on Riskesdas 2018, the prevalence of dental and oral problems in Central Java Province is 25.9% and 25.2% occurs in school children aged 10-14 years. According to the Semarang City Health Service, in 2018 Semarang City had the highest prevalence of active dental caries, namely 74.1%. (Kementerian Kesehatan RI, 2018) One of the efforts to reduce the number of dental caries is promotion. health. Promotion of dental and oral health is a promotional effort carried out to improve dental and oral health from an early age, one of the activities carried out is education on practices to improve dental and oral health (Kementerian Kesehatan RI, 2018).

Activities aimed at influencing someone to behave well in caring for their teeth and mouth and increasing public awareness of dental and oral health and providing an understanding of ways to maintain healthy teeth and mouth (Andriany et al., 2016; Ramos-Gomez et al., 2020). Promotion of oral and dental health plays an important role in schools, especially in increasing students' awareness of caring for their teeth and ensuring they are healthy for the long term. Means or efforts to provide the information you want to convey can be through print media,

electronic media (Radio, Television and others) or outdoor media so that the target can increase their knowledge, which is expected to ultimately change them to positive behavior. on health (Nurhidayat, 2012).

Health promotion media is an effort to provide information messages that want to be conveyed so that the target group obtains knowledge which can ultimately change their health behavior. The lack of attention given in educating children about dental health, one of the causes is until now in the form of lectures, children feel less interested and bored so learning is less than optimal (Setyawati, 2019; Rollins, 2020). One of the means to attract children's attention is in the form of pictures, one of which is a visual book which displays pop-up pictures and has a positive role by providing visuals and forming reading habits (Hanifah, 2014; Agata et al., 2022).

According to professional and paper technology observer Ellen G. Kreiger Rubin, pop-ups are examples of illustrations that appear in three dimensions when the page is opened, pulled or lifted. Pop-up books are a three-dimensional learning tool that can stimulate children's imagination and increase knowledge, so that it can facilitate children's understanding of images of the shape of objects and increase understanding (Pramesti, 2015). Based on this description, researchers are interested in conducting research on health promotion using pop-up book media on dental caries prevention practices in elementary school students.

## Methods

This research uses a quasi-experimental research method (pre and post-test with control group design). This research used two groups, namely one experimental group and one control group. The experimental group received treatment with pop-up book media while the control group received no treatment. This research is research that provides an initial test (pre-test) before the treatment is carried out, after being given the treatment then a final test (post-test) is given.

This research sample was taken using purposive sampling technique. Taking a sample of third grade students at SDN Tlogosari Kulon 5 and SDN Tlogosari Kulon 6, Semarang City, third grade students in each group totaling 35 students. Measurement of children's practice carried out interventions regarding the prevention of dental caries with the following activities: pre-test, health promotion given using pop-up book media and post-test.

An analysis was carried out which suspected that there were differences between the pre-test and post-test on the two variables. This is done with a different test. The statistical test used is the paired t test if the data is normally distributed or the Wilcoxon test if the data is not normally distributed to determine the effect before and after treatment is given. Then the Mann Whitney test was carried out to determine the difference in practice between the experimental group and the control group. This research has ethical approval, proof of the ethical clearance number, namely No: 121/EA/KEPK-FKM/2024 which was approved by the ethics team of the Faculty of Public Health, Diponegoro University.

## Result and Discussion

Based on the results of the research "The influence of health promotion using pop-up book media on knowledge and practice of preventing dental caries in elementary school children" which was conducted with 35 children as research respondents. Frequency distribution table of the data that has been collected after which data processing and analysis is carried out.

Table 1. Frequency Distribution of *Pre-Test* Intervention Group and Control Group

|                    | Knowledge of Dental Caries Prevention |      |      | %   |
|--------------------|---------------------------------------|------|------|-----|
|                    | Low                                   | Keep | Tall |     |
| Intervention Group |                                       |      |      |     |
| Before             | 14%                                   | 80%  | 6%   | 100 |

|               |     |     |     |     |
|---------------|-----|-----|-----|-----|
| After         | 0%  | 46% | 54% | 100 |
| Control Group |     |     |     |     |
| Before        | 14% | 74% | 11% | 100 |
| After         | 23% | 63% | 14% | 100 |

Source: Processed Researcher, 2024

Table 1 shows that children's knowledge about preventing dental caries in both groups before treatment was carried out in the low category was 14% in each group and there was 6% in the intervention group and 11% in the control group in the high category. In the table there are score results after health promotion treatment was carried out using pop-up book media on preventing dental caries in the intervention group, there was an increase, namely students in the low category to 0% and 54% in the high category. Compared with the control group with a very small increase

Table 2. Frequency Distribution of *Pre-Test* Intervention Group and Control Group

| Brushing Practices |     |      |      | (%) |
|--------------------|-----|------|------|-----|
|                    | Low | Keep | Tall |     |
| Intervention Group |     |      |      |     |
| Before             | 9%  | 77%  | 14%  | 100 |
| After              | 0%  | 57%  | 43%  | 100 |
| Control Group      |     |      |      |     |
| Before             | 14% | 77%  | 9%   | 100 |
| After              | 11% | 77%  | 11%  | 100 |

Source: Processed Researcher, 2024

Table 2 shows that children's practice regarding preventing dental caries in both groups before treatment was 77% in each group in the medium category and there were 9% in the intervention group and 14% in the control group in the low category. In the table there are score results after health promotion treatment was carried out using pop-up book media about preventing dental caries in the intervention group, there was an increase, namely students in the low category became 0%, 57% in the medium category and 43 % with high category. Compared with the control group with a very small increase

Table 3. Results of Prevention Knowledge Difference Test in Elementary School Students Intervention Group and Control Group

| Variable           | Mean | SD   | p-value |
|--------------------|------|------|---------|
| Intervention Group |      |      |         |
| Before             | 14,2 | 1,53 | 0,000   |
| After              | 16,1 | 1,76 |         |
| Control Group      |      |      |         |
| Before             | 12,4 | 3,8  | 0,950   |
| After              | 12,7 | 3,7  |         |

Source: Processed Researcher, 2024

After the intervention, the average knowledge score for elementary school students before the intervention group was carried out was 14.2 and after the intervention was carried out in the intervention group, the average was 16.1. It was seen that there was an increase in the average knowledge score in the group that was given health promotion treatment with pop-up book media about preventing dental caries. From the results of table 2, it is known that the p-value is 0.000 (p-value <0.05). It can be said that health promotion carried out with pop-up book media has an influence on the practice of preventing dental caries in elementary school

students. Meanwhile, in the control group, the results of table 3 show a p-value of 0.950. So it is said that there is no significant difference in the control group

Table 4. Results of Different Tests of Preventive Practices in Elementary School Students Intervention Group and Control Group

| Variable           | Mean | SD   | p-value |
|--------------------|------|------|---------|
| Intervention Group |      |      |         |
| Before             | 27,2 | 3,96 | 0,000   |
| After              | 30,3 | 3,34 |         |
| Control Group      |      |      |         |
| Before             | 27   | 4,40 | 0,927   |
| After              | 28   | 4,12 |         |

Source: Processed Researcher, 2024

Table 4 shows that after the intervention was carried out the average practice score for elementary school students before the intervention group was carried out was 27.2 with a standard deviation of 3.96. After the intervention was carried out in the intervention group, the mean was 30.3 with a standard deviation of 3.34. It was seen that there was an increase in the average practice score in the group that was given health promotion treatment with pop-up book media about preventing dental caries. From the results of table 2, it is known that the p-value is 0.000 (p-value <0.05). It can be said that health promotion carried out with pop-up book media has an influence on the practice of preventing dental caries in elementary school students. Meanwhile, in the control group, the results of table 4 show a p-value of 0.927. So it is said that there is no significant difference in the control group.

Table 5. Results of Different Tests of Preventive Practices in Elementary School Students Intervention Group and Control Group

|  |                | N         |
|--|----------------|-----------|
| Post-Test Experiment – Pre-Test Experiment | Negative Ranks | 5         |
|  | Positive Ranks | 26        |
|  | Ties           | 4         |
|  | <b>Total</b>   | <b>35</b> |
| Post-Test Kontrol – Pre-Test Kontrol       | Negative Ranks | 14        |
|  | Positive Ranks | 19        |
|  | Ties           | 2         |
|  | <b>Total</b>   | <b>35</b> |

Source: Processed Researcher, 2024

From table 5, the number of negative ranks or negative differences between the results of the experimental group is 5 respondents who show a decrease in the pre-test score to the post-test value and the positive ranks or positive difference, namely an increase in value, is 26 respondents.

Table 6. Results of Different Tests of Preventive Practices in Elementary School Students Intervention Group and Control Group

|  |                | N         |
|--|----------------|-----------|
| Post-Test Experiment – Pre-Test Experiment | Negative Ranks | 3         |
|  | Positive Ranks | 26        |
|  | Ties           | 6         |
|  | <b>Total</b>   | <b>35</b> |
|  | Negative Ranks | 13        |

|   |                |           |
|---|----------------|-----------|
| Post-Test Kontrol –<br>Pre-Test Kontrol | Positive Ranks | 15        |
|   | Ties           | 7         |
|   | <b>Total</b>   | <b>35</b> |

Source: Processed Researcher, 2024

From table 6, the number of negative ranks or negative differences in the results of the experimental group is 3 respondents who show a decrease in the pre-test score to the post-test value and the positive ranks or positive difference, namely an increase in value, is 26 respondents.

Table 7. Average Results of Preventive Knowledge in Primary School Students Intervention Group and Control Group

| Mean       | Ex. Intervention | Bald. Control | <i>p-value</i> | Ket.                  |
|------------|------------------|---------------|----------------|-----------------------|
| Pre test   | 14,2             | 12,2          | 0,000          | There is a difference |
| Post test  | 16,1             | 12,7          |                |                       |
| Difference | 1,4              |               |                |                       |

Source: Processed Researcher, 2024

The data shows that after conducting post-test testing on the two groups, the *p-value* is 0.000. It can be said that there is a difference in the average dental caries prevention practices between the experimental group and the control group.

Table 8. Average Results of Preventive Practices in Primary School Students Intervention Group and Control Group

| Mean       | Ex. Intervention | Bald. Control | <i>p-value</i> | Description           |
|------------|------------------|---------------|----------------|-----------------------|
| Pre test   | 27,2             | 27            | 0,001          | There is a difference |
| Post test  | 30,3             | 28            |                |                       |
| Difference | 2,1              |               |                |                       |

Source: Processed Researcher, 2024

Table 8 shows that after conducting post-test testing on the two groups, the *p-value* was 0.001. It can be said that there is a difference in the average practice of preventing dental caries between the experimental group and the control group. Based on the results of research conducted on grade 3 elementary school students, it shows that all respondents were 9 years old and there was no difference. age ratio between groups. This is the same as in general for 3rd grade elementary school students who are 9 years old.

The statistical results show that there is a significant difference in the average test data points in the Pop Up Book group. This significant difference was mediated by interventions that increased the average knowledge score. Meanwhile, the average knowledge in the control group did not experience a significant increase. This is also influenced by the limitations of the intervention in the control group

The increase in respondents' knowledge was due to their desire to learn and the need for health promotion to encourage self-management and provide new information or ideas, such as efforts to prevent dental caries in third grade elementary school students. Pop Up Book Media. Through Pop Up Book media, health promotion related to preventing dental caries was carried out several times in a pleasant atmosphere so as to encourage acceptance of the information provided by respondents. The increase in average information shows that information is strongly influenced by the frequency, distribution and development of information sources. 40 Based on the results of statistical tests, it is known that the Asymp Sig (2-tailed) value is 0.000.

Because the value of 0.000 is less than 0.05, it can be concluded that the hypothesis is accepted. This means that the learning outcomes and knowledge of Pop Up Book media before and after the test are different, so it can also be concluded that "Pop Up Book media influences students' knowledge about caries prevention efforts"

The increase in practice among respondents may possibly be due to the information received and can create an understanding of respondents' beliefs in having practical knowledge and skills to prevent cavities. The media used is very influential in changing respondents' practices, the experimental group can change the value of practice due to health promotion media by using pop-up books that are easy to understand and fun for children. Pop-up books provide more excitement for children, because reading pop-up books, children can interact by touching the pictures in them and arouse their curiosity. This change in knowledge and practice can encourage children to practice it in their daily lives.

## Conclusion

Health promotion regarding the prevention of dental caries carried out among elementary school students to increase children's knowledge and practice is very necessary. Children's habits which without them knowing will damage their teeth, with this media, namely pop up book media which is adapted to children's preferences, it will become a concern for elementary school children.

Pop up book health promotion media can increase students' knowledge about preventing dental caries. The average value of students' knowledge increased from 14.2 to 16.1 and the average value of students' practice increased from 27.2 to 30.3. Pop up book media can be used as an innovative health promotion medium in the classroom.

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