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"*Tan's Dent-Card Qr Model* Website Based" as an Effort to Improve Teeth Brushing Behavior and Dental Hygiene Status Primary School Children

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Abstract:- Background: Children aged 10-12 years have a very high rate of tooth decay at 57.6% with a mean (DMF-T) of 4.8. This is caused by one of the influencing factors, namely the low level of behavior in maintaining dental hygiene, as evidenced by the results of the 2019 Semarang City health data, that 86.7% of elementary school children do not have good tooth brushing behavior. The achievement of the new joint tooth brushing program is 47.8%, so innovation is needed in changing tooth brushing behavior, namely through the "Tan's Dent-Card QR Website Based Model" which is expected to improve tooth brushing behavior and the dental hygiene status of elementary school children. Research purposes:Producing a "Website Based Tan's Dent-Card QR Model" that is effective and feasible to implement to improve tooth brushing behavior and the dental hygiene status of elementary school children. Method : The method used in this research is Research and Development (R&D) with 5 research stages, namely needs identification, design and build, expert validation, feasibility test 1, and feasibility test 2. This research uses a pre-experimental design with a one- group pre-post-test. The sampling technique was purposive sampling consisting of 30 elementary school children aged 10-12 years who were given intervention for 14 days. Results: The validity results of the "Tan's Dent-Card QR Website-Based Model" show a value of p=0.000, which means this model is suitable for use to improve the behavior and dental hygiene status of elementary school children. "Tan's Dent-Card QR Website-Based Model" was also effective in enhancing tooth brushing behavior and dental hygiene status (p=0.000). In feasibility test 2, the result was p=0.000, which means the model is suitable for independent use by elementary school children aged 10-12 years. Conclusion: "Tan's Dent-Card QR Website-Based Model" is effective and ideal for use as an effort to improve tooth brushing behavior and the dental hygiene status of elementary school children.

Keywords:- *"Tan's Dent-Card QR Model Based on Website", Elementary School, Tooth Brushing Behavior, Dental Hygiene.*

I. INTRODUCTION

Having good physical and mental health is the most important part of life. Maintaining healthy teeth is very important because dental health is intrinsically linked to overall health, meaning that dental health can serve as a window into general body health.[1]

Everyone can experience dental caries regardless of age, gender, or status social economy. Children are more likely to suffer from this disease, especially those in the elementary school age range.[2] The enamel layer of children's primary teeth is thinner than permanent teeth, so elementary school children are more susceptible to dental caries. Children at this age usually do not have the good behavior and independence needed to maintain healthy teeth.[3]

In developed countries, the prevalence of caries in elementary school children is reported to be between 1 – 12%. The prevalence of caries in elementary school children in the United States is 3%, in Sweden is 7%, and Germany is 10%. 5. The prevalence of caries in elementary school children in developing countries in Southeast Asia, namely Vietnam is 95%, Cambodia 93%, Laos 89 %, Filipino 88% and Chinese 85.5%. [4]

According to data from the World Health Organization (WHO) in 2021, 87-90% of elementary school students (6-12 years) around the world have dental health problems. Globally, 2.4 billion people, or 36% of the population, have high levels of dental caries.[2] About 3.5 billion people worldwide suffer from dental disease and about 530 million children have dental caries in their primary and permanent teeth. United States dental health data states that cavities in children aged 6-12 years are around 92%, while in adults it reaches 56% [3]. Every year, there is a significant increase in the frequency of dental health problems in Indonesia. Riskesdas in 2007 showed dental health problems (23.1%), in 2013 it increased (25.9%) and in 2018 there was a very high increase (57.6%) in tooth decay [5]

Efforts to prevent dental caries in children have been carried out in various countries in different ways, namely focusing on creating a healthy environment and encouraging independent individual health practices. The World Health Organization (WHO) initiated the "Global School Health

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Initiative" program, which aims to improve children's health through school health programs in the form of developing learning models that include dental health and efforts to prevent disease in children [6].

Human behavior is shaped by various experiences and interactions with the environment, in the form of knowledge, attitudes, and skills. Knowledge is a form of understanding from a person that underlies changes in attitudes or perceptions. Attitude is a further perception of a form of understanding, good knowledge will reflect attitudes and skills that are in line [7].

The model of dental health education given to elementary school children is generally central conventional, which means it still focuses on the involvement of instructors. This is in line with relevant research, namely in practice efforts to improve elementary school children's teeth brushing skills using lecture and demonstration methods using posters and flipcharts. As a demonstration, stated that 57.8% of students did not have good teeth-brushing skills [7]. This media model still has many shortcomings when implementing the program, which causes children to become inactive and creative in learning, and children become unfocused and busy with their world. An innovation model is needed that suits the abilities and characteristics of children in creating an effective and attractive dental health education model to increase the independence of elementary school children [8].

Brushing teeth is an effective and efficient action to prevent dental and oral diseases by brushing the surface of the teeth from food debris [3]. To get optimal results, brush your teeth twice a day, in the morning after breakfast and at night before bed. However, people usually brush their teeth when they shower in the morning and evening [4]. The 2018 Riskesdas results showed that the group of elementary school children had the habit of brushing their teeth every day (86.7%), but the proportion of brushing their teeth correctly (2.8%) in Central Java province was only 2.0% [8]. The health profile of Central Java Province in 2019 stated that the achievement of the joint tooth brushing program in schools, especially in Semarang City, was only 47.8% and the achievement of action for students who needed treatment was only 50.7% [9]. When compared with the national goal of 80% preventive services and 100% promotional services, this percentage is relatively low [7].

Based on initial observations carried out by researchers at the Pakis Aji Regional Health Center at KB Nurul Qolbi, Tanjung Village with a total of 61 research subjects, it was stated that the child's dental caries status was 100%, where the mean def-t was 6.09, which means that each child had 6 dental caries. This problem is because of low dental health behavior in elementary school children, especially tooth brushing behavior. This is in line with interviews with schools and community health centers stating that there has been no media and model innovation in dental maintenance program efforts, there is no availability of trained human resources (teachers and student guardians) or (health workers), there is no special budget for implementing the maintenance program. Teeth, as well as the lack of cooperation with the related health centers or hospitals.

To address these problems, it is necessary to innovate dental health program learning models by designing dental health education models that can improve students' knowledge, attitudes, and teeth-brushing skills. The innovative model created, namely "Tan's Dent-Card QR Website-Based Model", aims to increase knowledge of dental care, especially in implementing tooth brushing behavior and efforts to improve the dental hygiene status of elementary school children.

The innovation of the website-based dental health education model is an effort to develop an educational model that uses website pages as the main domain in a comprehensive education and learning system. Its development is more flexible and creative. "Tan's Dent-Card QR Website-Based Model" has been adapted to the characteristics and abilities of children to be a solution to problems and needs to attract children's motivation and independence in brushing their teeth.

"Tan's Dent-Card QR Website-Based Model" is a model designed on a website basis accompanied by a card as a supporting tool for 14 days. Changing behavior into a habit takes an average of 66 days, but “Tan's Website Based Dent-Card QR Model" which consists of an attractively designed card as an educational model for brushing teeth designed with a QR (Barcode) to be accessed via the website is expected to be a solution to this problem. "Tan's Dent-Card QR" is given access to each student's ID so that it makes it easier to access it. The stages of model implementation are preparation, implementation, evaluation, and model maintenance.

II. RESEARCH METHOD & SAMPLE

The research method used is Research and Development (R&D) with the ADDIE model developed by Dick and Carry 1996 to develop a particular model and then test the effectiveness of the model. [10]

The research and development procedure includes 5 main steps, as follows: 1) Identification of needs 2) Design design 3) Expert validation (4) Feasibility test 1 and 5) Feasibility test 2/End user.

The sample was elementary school children aged 10-12 years at SD N Kramas, Semarang using a purposive random sampling technique totaling 30 students.

III. RESULTS AND DISCUSSION

A. Validity and Reliability Test

A validity test is a test to measure the accuracy of the data collected with the data that occurs on the object under study. Valid means that the instrument can be used to measure what it wants to measure. An instrument is said to be reliable if the measurement results are relatively consistent when the measurement is carried out twice or

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more. Reliability shows the consistency of a measuring instrument in measuring the same symptoms.

Table 1 Validity and Reliability Test

Variable	P-Value	
	Validity	Reliability
Tooth Brushing Knowledge	0.890	0.960
Teeth Brushing Attitude	0.968	0.925
Teeth Brushing Skills	0.925	0.937

Validity Reliability Test

Based on Table 1, the results of the validity test for the knowledge, attitudes, and skills variables have a p-value > 0.361, which means they are valid. For the reliability test results, the knowledge variable is 0.960, the attitude variable is 0.925 and the skills variable is 0.937, so it is proven that all variables are reliable and consistent for measurement.

B. Expert Validation Statistical Test

Carried out to obtain data that is used as a basis for testing the feasibility of Tan's Dent-Card QR Website-Based Model:

Table 2 Expert Validation Test

Subject	*Mean*	ICC	*P-value*
4 Validators	95.83%	0.938	0,000

[*]***Interclass Correlation Coefficient***

Based on Table 2, the mean score is 95.83% with a p-value = 0.000, which means the model is declared suitable for testing. ICC test results in 0.938 with very feasible category (Excellent Reability)

C. Univariate Analysis

The research subjects were 30 elementary school children aged 10-12 years, consisting of 10 grade 4 students, 10 grade 5 students, and 10 grade 6 students.

Table 3 Data on Characteristics of Elementary School Children

No	Variable	N	%
1	**Gender**		
	Man	12	40
	Woman	18	60
2	**Age**		
	10 years	7	23
	11 years old	14	47
	12 years old	9	30

[*]***Frequency Distribution***

Based on Table 3, the data on the characteristics of elementary school children based on gender, the majority are girls (60%), and based on age, the majority are 11 years old (47%).

Table 4 Distribution of students based on DMF-T scores

DMF-T Score	Frequency (n)	Percentage (%)	Mean
0	0	0	4,321*
1	1	3.3	
2	2	6,7	
3	5	16.7	
4	12	40	
5	4	13.3	
6	4	13.3	
7	1	3.3	
8	0	0	
9	0	0	
10	1	3.3	
Total	30	100	

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Based on Table 4, the distribution of students who have caries experience (DMF-T) varies between 0 (no caries) for 2 students to 10 carious teeth for 1 person. The results of student distribution data based on DMF-T scores varied, with a mean DMF-T for children of 4.3.

D. Data Normality Test

The data normality test aims to determine whether the data collected on each variable is normally or not normally distributed. Normality testing in this study used the Shapiro-Wilk test because the sample subjects in this study were less than 50.

Table 5 Normality Test of Data on Knowledge, Attitudes, Teeth Brushing Skills, and OHI-S Scores

Variable	P-Value	
	Pre-test	Post-test
Tooth Brushing Knowledge	0.001	0.008
Teeth Brushing Attitude	0.004	0.001
Teeth Brushing Skills	0.005	0.002
OHI-S Index	0.001	0.004

****Shapiro-Wilk***

Based on Table 5, the results of the pre-posttest normality test for each variable are p-value <0.05, meaning the data is not normally distributed so it will be tested using a non-parametric test.

E. Bivariate Analysis (Model I Feasibility Test)

The bivariate test is used as a test of the effectiveness of the model which will be tested using a paired test. The following are the results of the model effectiveness test:

Table 6 Model Effectiveness Test on Knowledge, Attitudes, Skills, and OHI-S Scores

Variable	Mean ± SD Pretest	Mean ± SD Posttest	Delta (Δ)	P-value
Knowledge	12.53 ±3.401	15.93 ± 1.818	3.4 ± 1.583	0,000
Attitude	52.13±8.547	64.03 ± 5.537	11.9 ± 3.01	0,000
Teeth brushing skills	16.17 ±3.842	24.42 ± 3.081	8.25 ± 0.761	0,000
OHI-S Index	1,567±4,901	0.813 ± 4.876	0.754 ± 0.025	0,000

Wilcoxon

Based on Table 6, the results of the model effectiveness test for each pre-posttest variable are p-value <0.005, meaning the model is effective in increasing knowledge, attitudes, skills, and OHI-S index.

Knowledge has increased in the pre-post test as evidenced by (Δ) Mean ± SD Pretest 3.4 ± 1.583, Children's attitudes have increased in the pre-post test as evidenced by (Δ) Mean ± SD Pretest 11.9 ± 3.01, Skills brushing teeth increased in the pre-post test as evidenced by (Δ) Mean ± SD Pretest 8.25 ± 0.761, and the OHI-S score experienced a decrease in scores in the pre-post test as evidenced by (Δ) Mean ± SD Pretest 0.754 ± 0.025

F. Model II Feasibility Test

The Model II feasibility test aims to determine that the Website-Based Tan's Dent-Card QR Model is suitable for independent use by elementary school children.

Table 7 Model II Feasibility Test (Assessment Questionnaire)

Subject	*Mean*	ICC	*P-value*
30 students	87%	0.978	0,000

****Interclass Correlation Coefficient***

Based on Table 7, the model II feasibility test with a mean score of 87% and ICC 0.978 in the Excellent Reability category. As well asp-value = 0.000, which means the model is declared very suitable for use independently by elementary school children dental health education model.

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Table 8 Observation Checklist

Subject	Results	Researcher's Interpretation
30 students	Feasible model as a media for dental health education proven by ICC and feasibility of 88%	Elementary school children can use the model independently with a user guide module.

Interclass Correlation Coefficient

Based on Table 8, the results of the model II feasibility test show that the model is very suitable as a medium for improving tooth brushing behavior and the dental hygiene status of elementary school children. This can be seen in elementary school children who can use media by the Model usage guide module.

IV. DISCUSSION

The children's dental health program in elementary schools is carried out once a year. The obstacles experienced are limited media and a lack of innovation in dental health education models. Technological developments can be used as a solution to develop innovation in the field of learning to make it more interesting and informative. [11]

"Tan's Dent-Card QR Website-Based Model", a model that can raise children's awareness to increase independence and motivation to brush their teeth. The expert validation process is carried out to produce a good model so that, to support dental health processes and practices, expert validation is carried out to determine the suitability of the model. [12]

The expert validity results show a mean of 95.83 and an ICC value of 0.938, which means that "Tan's Dent-Card QR Website-Based Model" is suitable for use as a dental health promotion media.

A. Model I Feasibility Test

- *Test the Effectiveness of the Model on Knowledge of Brushing Teeth*

"Tan's Dent-Card QR Website-Based Model" with a p-value < 0.05 means it is effective in increasing children's knowledge. For 14 days children independently use the model at home, which is accompanied by a quiz menu feature and educational videos as dental health information. Can be accessed every day by children.

As supported by (Maryani, 2022) for 14 days using the educational model obtained after the person was exposed to certain objects, knowledge is very closely related to the educational model intervention. [13]

Within 14 days of using "Tan's Dent-Card QR Website-Based Model" as an educational model, it is hoped that it can improve the memory of understanding which is formed in the form of good habits and behavior, so that children's knowledge is good and can be reflected in the form of daily tooth brushing activities at home.

- *Test the Effectiveness of the Model on Teeth Brushing Attitudes*

"Tan's Dent-Card QR Website-Based Model" with a p-value < 0.05 means it is effective in improving children's attitudes. For 14 days, the child independently uses a model at home which is designed according to the child's age and ability to carry out daily activities for 14 days easily and has been monitored every day by researchers.

Supported by (Ilmianti, 2020) that information and communication can improve children's attitudes, this happens because a person's response after being given information and understanding is then applied in the form of action. [14]

- *Test the Effectiveness of the Model on Teeth Brushing Skills*

"Tan's Dent-Card QR Website-Based Model" with a p-value < 0.05 means it is effective for improving children's teeth brushing skills. Skills increase because for 14 days children immediately practice brushing their teeth in the 14 days daily activity feature.

Supported by (Latuconsina, 2021) children's skills are well formed and applied in everyday life through understanding the material, which is reflected in the form of attitudes and skills [15].

- *Model Effectiveness Test on Dental Hygiene Status (OHI-S)*

"Tan's Dent-Card QR Website-Based Model" with a p-value <0.05 means it is effective in reducing children's OHI-S scores. The decrease in children's OHI-S scores is relevant to the increase in knowledge and behavior of brushing teeth as a result of intervention using the model.

Supported by (Puspita, 2019) that the decrease in OHI-S scores occurred because children immediately practiced brushing their teeth every day, thereby achieving good dental hygiene status. [16]

B. Model II Feasibility Test

Tan's Dent-Card QR Website-Based Model" with a mean of 87% and an ICC of 0.978, meaning the model is suitable as a medium for dental health education. Elementary school children as end users can use the model independently with a guide module for using the model. Good responses and positive perceptions as an analysis of the feasibility of using the model. "Tan's Dent-Card QR Website-Based Model" is suitable for use as a medium for promoting dental health in elementary school children aged 10-12 years.

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Supported by (Sittatunnukmah, 2023) assessment tests and analysis are needed after being given model intervention, so that the model is proven suitable for direct use by users. [12]

Elementary school children as end users of dental health education in their golden years are expected to form memories, behaviors, habits, and attitudes about how to care for their teeth, so that this behavior will carry over well into adulthood. Using "Tan's Dent-Card QR Website-Based Model" by elementary school children as end users is expected to increase children's independence and motivation to brush their teeth so that children's dental hygiene status is good.

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