

RESEARCH ARTICLE

Educational approaches to improving knowledge and attitude towards dental hygiene among elementary school children

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ABSTRACT

The selection of appropriate dental health education methods will be beneficial in promoting dental health. This study aimed to determine the difference in the effect of role-playing method and storytelling method on knowledge and attitudes towards oral hygiene among elementary school students. The research subjects were 112 students in grade 5. The subjects were divided into 2 different treatment groups, namely 56 students in grade 5 at SD Negeri Tegalrejo I with the storytelling method and 56 students in grade 5 at SD Negeri Tegalrejo II using the role-playing method. The measuring instrument in this research was a questionnaire. The data analysis used the Mann-Whitney test and Wilcoxon Signed Ranks test because the data were not normally distributed. The results of the analysis showed that there was a significant increase over time in knowledge and attitudes carried out in 3 assessments. The mean rank for delta values between the pre-test and posttest 2 for the knowledge variable using the role-playing method was 51.29 while that using the storytelling method was 61.71. Meanwhile, the mean rank for delta values for the attitude variable using the role-playing method was 49.93, while that using the storytelling method was 63.07. The results of the delta analysis from pre-test to post-test 1 and pre-test to post-test 2 showed that the storytelling group experiences a higher increase in knowledge and attitudes than the role-playing group ($p < 0.05$). Provision of education using a storytelling method shows better improvement in students' knowledge and attitudes towards oral hygiene than using a role-playing method.

Keywords: attitude; knowledge; oral health education; role-playing method; storytelling method

INTRODUCTION

Changes in knowledge and attitudes towards maintaining dental and oral hygiene can occur naturally, namely changes due to environmental influences. These changes may happen intentionally and systematically through counseling.^{1,2} The process of changing knowledge and attitudes naturally is usually slower than that through counseling.³ Oral and dental hygiene education regarding the importance of maintaining oral hygiene will be more effective if it starts to be given from an early age.^{4,5}

Primary school students need to maintain the cleanliness of their teeth and mouth from an early age because elementary school students are very vulnerable to dental and oral hygiene problems, one of which is dental caries.⁶ The process of dental and oral hygiene education must be carried out using appropriate learning methods,

allowing for the information concerning dental and oral health to be presented in more attractive and easy to understand ways, thus bringing a positive impact to change the knowledge and attitudes of elementary school students.^{3,5}

The use of appropriate learning methods should be derived from several approaches such as the role-playing method and the storytelling method, so as to provide good results. The role-playing method will help students, by acting out a situation in human life. The results of previous studies showed that dental hygiene education using the role-playing method could increase knowledge and attitudes to prevent dental and oral diseases.^{6,7}

The storytelling method is commonly used in the education process because it could help convey large amounts of information to a group of listeners in a short time. The storytelling method is a simple

fictional story that serves to both educate and entertain. The results of prior studies suggested that counseling using the storytelling method could increase the knowledge and attitudes of elementary school students in improving oral and dental hygiene.^{6,8}

The results of dental hygiene education can be measured through knowledge and attitudes. Knowledge is one of the important domains for the formation of action. Attitude is a tendency to act (practice) and is not necessarily manifested in action.¹ Teeth and mouth must be kept clean because various germs can enter the body. Good oral and dental hygiene will make the teeth and surrounding tissues healthy and function properly, while poor oral and dental hygiene will form plaque and tartar which can lead to dental and oral diseases such as dental caries, gingivitis, and periodontal disease.

The results of surveys by the Ministry of Health of the Republic of Indonesia in 2013 and 2018 showed that the number of Indonesians and residents of the Special Region of Yogyakarta Province who had a good habit in brushing their teeth according to the recommendations, namely after breakfast and before bed at night tended to decrease.^{9,10} These findings indicated that people do not understand how to brush their teeth properly. This study aimed to determine the difference in the effect of role-playing method and storytelling method on knowledge and attitudes towards oral hygiene among elementary school students.

Toothbrushing and healthy diet are taught to school children. However, conventional instructional approaches may not be effective. Innovative ways of delivering instruction materials are needed. Role-playing and storytelling are options for improving the teaching method. The objective of this study was to assess which innovation, i.e., either role playing or storytelling approach, is better for the attainment of learning outcomes.

MATERIALS AND METHODS

Ethical clearance was obtained from the Research Ethics Commission of the Faculty of Dentistry,

Universitas Gadjah Mada No. 00287/KKEP/FGK-UGM/EC/2019. This was a quasi-experimental study with a pre-test and posttest group design.

The research subjects were grade 5 students, who were divided into 2 different treatment groups, namely 56 grade 5 students at SD Negeri Tegalrejo I who were taught using the storytelling method and 56 grade 5 students at SD Negeri Tegalrejo II who were taught using the role-playing method. The independent variable in this study was the teaching approach, either the role-playing method or the storytelling method, while the dependent variables were the knowledge, attitudes, and oral hygiene status of the school children.

Questionnaires were used to measure the students' knowledge and attitudes towards oral and dental hygiene. The validity and reliability tests were carried out on 30 students at SD Negeri Tegalrejo III, Tegalrejo Subdistrict, Yogyakarta City, Special Region of Yogyakarta. The results of the questionnaire validity test showed that 10 knowledge statement items were declared valid (r between 0.534-0.798) and reliable (Cronbach $\alpha = 0.872$) and 18 attitude statement items were declared valid (r between 0.401-0.754) and reliable (Cronbach $\alpha = 0.846$).

The initial measurement of the students' knowledge and attitudes towards dental and oral hygiene was carried out before the treatment (pre-test). Post-test 1 was carried out two weeks after the treatment and post-test 2 was carried out three months after the intervention. The data analyses used the Mann-Whitney test and Wilcoxon Signed Ranks test because the data were not normally distributed.^{11,12,13,14}

The intervention in this study was either the role-playing or storytelling method to deliver key messages: appropriate tooth brushing, diet, and dental visit. The role-playing method was oriented to actions, including how to brush the teeth, how to eat proper diet, and how to visit a dentist. Two students showed how to brush their teeth, select proper diet and avoid foods high in sugar, and explain how to visit a dentist for dental health examination in front of their class-mates. The role-playing was performed by two students

who role-played as a mother and her child. They discussed why brushing the teeth, eating proper food, and visiting a dentist are important to protect oral health in front of their class-mates.

RESULTS

The respondents' characteristics based on gender and age in the groups taught using the role-playing

method and storytelling method can be seen in Table 1. Table 1 shows that there was no gender difference between the two groups ($p>0.05$). The majority of the study respondents were 11 years old. There was no age difference between the groups with the role-playing and storytelling methods ($p>0.05$).

Table 2 shows that the respondents in both the role-playing group and the storytelling group

Table 1. Distribution of respondents by gender and age in the group with the role-playing and the storytelling method

Respondents' characteristics	Role-Playing method		Storytelling method		Total		p sig.
	n	%	n	%	N	%	
Gender							0.571 ^c
Male	27	48.2	30	53.6	57	50.9	
Female	29	51.8	26	46.4	55	49.1	
Age							0.376 ^c
11 years	48	85.7	51	91.1	99	88.4	
12 years	8	14.3	5	8.9	13	11.6	
Total	56	100	56	100	112	100	

^cPrimary demographic data

Table 2. Results of the Chi-Square test for the variable of knowledge about dental and oral hygiene in the groups taught using the role-playing method and storytelling method

Treatment	Variable	Role-Playing method		Storytelling method		Total		p sig.
		n	%	n	%	n	%	
Pre-test	Knowledge							0.815 ^c
	Poor (0-33)	3	5.4	3	5.4	6	5.4	
	Fair (34-67)	36	64.3	39	69.6	75	67	
	Good (68-100)	17	30.4	14	25.0	31	27.2	
Post-test 1	Knowledge							0.036 ^c
	Poor (0-33)	1	1.8	1	1.8	2	1.8	
	Fair (34-67)	35	62.5	27	48.2	62	55.4	
	Good (68-100)	20	35.7	28	50	48	42.9	
Post-test 2	Knowledge							0.019 ^c
	Poor (0-33)	1	1.8	0	0	1	0.9	
	Fair (34-67)	32	57.1	23	41.1	55	49.1	
	Good (68-100)	23	41.1	33	58.9	56	50	
	Total	56	100	56	100	112	100	

^cPrimary data: comparison of knowledge changes between the two educational approaches

Table 3. Chi-Square Test Results for the Variable of Attitude towards dental and oral hygiene in the Role-Playing and Storytelling groups

Treatment	Variable	Role-playing method		Storytelling method		Total		p sig.
		n	%	n	%	n	%	
Pre-test	Attitude							0.085 ^c
	Poor (20-40)	0	0.0	0	0.0	0	0.0	
	Fair (41-55)	28	50.0	37	66.1	65	58.0	
	Good (56-80)	28	50.0	19	33.9	47	42.0	
Post-test 1	Attitude							0.033 ^c
	Poor (20-40)	0	0.0	0	0.0	0	0.0	
	Fair (41-55)	26	46.4	21	37.5	47	42.0	
	Good (56-80)	30	53.6	35	62.5	65	58.0	
Post-test 2	Attitude							0.021 ^c
	Poor (20-40)	0	0.0	0	0.0	0	0.0	
	Fair (41-55)	22	39.3	17	30.4	39	34.8	
	Good (56-80)	34	60.7	39	69.6	73	65.2	
	Total	56	100	56	100	112	100	

Primary data: comparison of attitude changes between the two educational approaches

Table 4. Results of the wilcoxon signed-rank test of the variable of knowledge about dental and oral hygiene before and after treatment using the role-playing method and storytelling method

Knowledge Variable	Role-playing method			Storytelling Method		
	Z value	Delta	p sig.	Z value	Delta	p sig.
Pre-test to post-test 1	3.632	0.32	0.00	3.969	0.36	0.000
Pre-test to post-test 2	4.099	0.48	0.00	4.893	0.80	0.000

Table 5. Results of the mann whitney test on difference in the mean rank of knowledge about oral and dental hygiene before and after treatment using the role-playing method and storytelling method

Knowledge variable	Role-playing method (mean rank)	Storytelling method (mean rank)	p sig.	Result
Pre-test	56.79	56.21	0.922	Not significant
Post-test 1	50.13	62.87	0.034	significant
Post-test 2	47.38	65.63	0.002	significant

Table 6. Results of wilcoxon signed-rank test of the variable of attitude before and after treatment using the role-playing and storytelling methods

Attitude variable	Role-playing method			Storytelling Method		
	Z Count	Delta	p sig.	Z Count	Delta	p sig.
Pre-test to post-test 1	1.508	.80	0.137	4.061	1.16	0.000
Pre-test to post-test 2	3.171	3.14	0.002	4.836	4.88	0.000

Table 7. Results of mann whitney test of the variable of attitudes towards dental and oral hygiene before and after treatment using the role-playing method and storytelling method

Attitude variable	Role-playing method (mean rank)	Storytelling method (mean rank)	p sig.	Result
Pre-test	59.35	53.65	0.351	not significant
Post-test 1	55.54	58.54	0.003	significant
Post-test 2	47.74	65.26	0.004	significant

showed no difference in knowledge before the treatment (pre-test). After the treatment, both groups experienced an increase in knowledge as seen in post-test 1 and to post-test 2.

Table 3 shows that the respondents in both the role-playing group and the storytelling group showed no difference in attitudes ($p > 0.05$) before the treatment (pre-test). After the treatment, there was an increase in the attitudes of the respondents in both groups as seen in post-test 1 and post-test 2. The results of the analysis of differences in the mean rank of knowledge about dental and oral hygiene before and after the treatment using the Role-Playing Method and the Storytelling Method using the Wilcoxon Signed Rank Test are presented in Table 4.

Table 4 shows that in the two treatment groups, there was a significant increase in knowledge from pre-test to post-test 2 ($p < 0.05$). It can be concluded that teaching with the role-playing method and storytelling method significantly increased knowledge about oral and dental hygiene.

Table 5 shows that knowledge about oral and dental hygiene among the two groups was not significantly different before the intervention. However, there were higher knowledge scores in the group taught with the storytelling method compared to those with the role-playing method as seen in post-test 1 and post-test 2.

The results of the analysis of the difference in the mean rank of attitudes towards dental and oral hygiene before and after the treatment using the role-playing method and the Storytelling Method using the Wilcoxon Signed-Rank Test are presented in Table 6.

Table 6 shows that the increase in attitude from pretest to post-test 1 and post-test 2 was

significant. The increase in attitude was higher in the group taught using the storytelling method.

The results of the analysis of the mean rank difference of attitudes towards oral hygiene between the Role-Playing Method and the Storytelling Method based on the pre-test, post-test 1, and post-test 2 data using the Mann Whitney test are presented in Table 7.

There was no significant difference in the mean rank of attitude between the two groups based on the pretest (Table 7). The group taught with the storytelling method showed significantly higher mean rank of attitude compared to those taught with the role-playing method based on post-test 1 and post-test 2.

The group taught using the story-telling demonstrated better improvement than the group taught using the role-playing method in both the knowledge and attitude variables compared to the pretest scores. The differences in the improvement in knowledge and attitudes between the two groups were statistically significant, except the increase in knowledge from pre-test to post-test 1.

DISCUSSION

The results of the descriptive analysis showed that the changes in knowledge about oral hygiene in the good category in treatment group II (storytelling) were better than those in treatment group I. The results of the delta analysis showed that there was a significant difference in the increase in knowledge in treatment group II, which was better than treatment group I. These findings indicated that the storytelling method was more effective in improving knowledge among primary school children.^{7,15}

Knowledge is something formed by the basic epistemic components, namely belief, truth, and justification. According to the traditional theory, knowledge is obtained when our beliefs are correct, and when conditions of justification are also satisfying. Knowledge can be obtained from direct experience or through counseling, both individually and in groups, which aims to achieve changes in the behavior of individuals, families, and communities in realizing optimal health degrees.¹ Behavior begins to be formed from knowledge and is a cognitive domain that is very important for the formation of an action.³

Knowledge of dental and oral hygiene should be given from an early age, when children begin to understand the importance of health and the things that must be avoided or the habits that can be developed to maintain the good condition of their teeth. Teaching about oral hygiene should be given to school-age children.

Changes in knowledge about the maintenance of dental and oral hygiene can occur naturally, namely changes due to environmental influences and changes intentionally and systematically through counseling. The process of changing knowledge and attitudes naturally is usually slower than through counseling. Education of dental and oral hygiene regarding the importance of maintaining dental and oral hygiene will be more effective if it starts early.¹⁶

Story telling in treatment group II imparted greater knowledge compared to role-playing in treatment group I. The increase in knowledge was higher in treatment group II because after exposed to the story, the subjects had the opportunity to ask questions about the materials delivered using teaching aids in the form of hand puppets to solve problems related to the stories being told. In performing the storytelling method, the students were more active in asking and answering questions to find various things related to good learning, understanding the concepts of reasoning and communication as well as problem solving. In the storytelling method, the subjects could immediately ask the story-teller if they found any things they did not understand, then analyzed and concluded what had been done by themselves. The story-telling method allowed the students

to be involved in digging up information, asking questions, doing activities, finding, collecting data, analyzing the data, and drawing conclusions.¹⁷

The fact that the storytelling method brought better improvement in knowledge than the role-playing method was associated with better attitude improvement. Attitude consists of affective and cognitive components.¹⁸ Attitudes have levels based on their intensity, namely: a) Accepting, i.e., the subject is willing to accept a given stimulus, b) Respecting, i.e., the subject gives a positive value to the object or stimulus, d) Responsible, i.e., the subject is responsible for what he/she believes. Attitude is the result of a person's socialization process who reacts in accordance with stimuli in the form of objects.¹⁹

The storytelling method can be done individually or in groups. The technique is the same as the demonstration method, but in the storytelling method, students are more active in asking and answering questions, so expectedly they are able to find various things related to learning, including the concepts of reasoning and communication as well as problem solving.^{6,8,15,20}

A higher increase in the attitude score in the treatment group taught using the storytelling method using the hand puppet showed that the subjects responded more to the information received from the instructor and could lead to understanding, thus affecting the subjects' attitude. The stimuli received through a process carried out by the instructor using the hand puppets improved the subjects' confidence and tendency to act.²¹ It is suggested to use the story-telling method in the education of primary school students to improve reading skills.²² The story-telling method allows students to be engaged in a constructivist learning environment based on novel principles of teaching and learning, such as through digital means.²³

CONCLUSION

The story-telling method increases the knowledge and attitudes of elementary school students towards dental and oral hygiene better than the role-playing method. Improvement in knowledge

and attitude towards oral health practices in the story-telling method is associated with cognitive and affective factors stimulated by interactive processes in accordance with the principles of student-centered learning in a constructivist learning environment.

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