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Effect of Health Promotion with Halma Simulation on Knowledge Level of Caries Prevention of 1st Grade Students of SDN 115 Turangga Bandung City

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ABSTRACT

World Health Organization (WHO) states that around 60-90% of school-aged children have teeth caries. From the data of Basic Health Research 2013, it is stated that teeth caries patients are 53.2%. In Bandung City, the caries rate is 53.9%, while in Puskesmas (Public Health Center) Cijagra Lama, the teeth caries incident rate on children that mostly occurs in SDN (Public Elementary School) 115 turangga is 89%. The objective of this research is to find out the effect of health promotion with modified halma simulation on the influence of health promotion with halma simulation on knowledge level of teeth caries prevention in 1st grade students of SDN 115 Turangga Bandung City. The type of this research is pretest-posttest one group design on a population of 46 children. The data collection technique is conducted with halma simulation and questionnaire. The data analysis used is univariate and bivariate with Wilcoxon Matched Pairs Test. The result of this research analysis shows that there is an effect of modified halma simulation health promotion on the level of knowledge in teeth caries prevention on those 1st graders, with p-value rate (2-tailed) is <0.05, and the significance level (.Sig) is 0.013. Based on the research result, it is necessary to conduct a further research on the behavior in preventing teeth caries on the higher grades.

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1. Introduction

Problems with dental health are teeth caries, gingivitis, pulpitis, hypersensitive teeth, etc (Puspitaningtyas et al, 2017) . Teeth caries has high prevalence among other dental diseases (Sumantriet al, 2013), i.e. 53.2%, and occurs on children. According to World Health Organization (WHO) in 2012, around 60-90% of school-aged children around the world suffer teeth caries. There was an increase of teeth caries prevalence on Indonesian people compared to the one in 2007 and 2013, i.e. from 43.4% into 53.2% or more or less in Indonesia, there are 93,998,727 people who suffer teeth caries. Based on the age characteristics, children with the ages of 5 to 9 receive increase from 21.6% into 28.9%, and children with the ages of 10 to 14 receive an increase from 20.6% into 25.6% (Riset Kesehatan Dasar, 2013).

The teeth caries incident rate especially on the 1st grade elementary school (SD) students in 2015 was 62.81%, while in 2016, it was 53.9%. This number was the highest number compared to other disease such as serumen and Ear-Nose-Throat (THT) diseases, which were only 42% and 32% (Dinas Kesehatan Kota Bandung, 2015; Dinas Kesehatan Kota Bandung 2016*).* Public Health Center (Puskesmas) Cijagra Lama covers 13 elementary schools, more than the other three *puskesmas* in Lengkong District, Bandung City, with the number of 1st graders population is 1,355 children. Lengkong is also the district with the most students in Bandung City. Furthermore, the highest teeth caries incident rate in SDN 115 Turangga is 89% (Laporan Hasil Penjaringan Siswa, 2017*).*

There are four main factors that play role in caries formation, i.e. dental anatomy and host, microorganism, carbohydrate and time. Besides the direct factors that occur inside the mouth, there are also indirect factors (*predisposition*), i.e. race, age, gender, descendance , social status as well as attitude and behavior (Tarigan, 2015). Based on the analysis in the Basic Health Research (*Riskesdas*) in 2007 and 2013, it can be obtained that the trend of proper and same tooth-brushing behavior is very low, i.e. 7.3% and gets lower into 2.3%. This behavior appears as a result of the lack of children's knowledge on the importance of dental and mouth maintenance, so that they ignore

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the cleanliness of teeth and mouth (Rahtyanti et al, 2018). This becomes the cause of the emergence of dental and mouth health problems that often occur on school-aged children (Sari et al, 2012; Rosdewi, 2015).

Knowledge is a very important domain in shaping over behavior. One of the ways to gain knowledge is by using health education to provide knowledge as a base of behavioral change that can improve health status (Sumantri et al, 2013; Pandelaki& Mayan, 2013). Health education activities are expected to be able to assist in the achievement of medical program, rehabilitation, disease prevention and health improvement (Widiyanto, 2014). Health promotion is a revitalization of health education. One of the methods of health promotion is simulation game, which is a combination of roleplay and group discussion. Game method is chosen because learning process will be more effective and fun if it is combined with game (Rusli & Gondhoyoewono, 2012).

Health messages are packaged in several forms of games (Sumantri et al, 2013) such as snake and ladders monopoly, puzzle, or, ludo as well as halma. Halma is a simulation game that can be developed for health promotion because this game gives significant effect on students' aptitude and learning results. Furthermore, it is also one of the games that is easier to be modified and can be inserted with pictures and materials in one game (Prasetyono, 2015). This halma game has triangles for strategy and jumping other players, and also has health promotion. Therefore, children will unconsciously know that they are given knowledge (Sari et al, 2012). The improvement of knowledge to fix dental and mouth maintenance behavior to prevent tooth caris can be done with the halma game simulation.

2. Methods

The method used in this research was *pretest-posttest one group design.* In this design, there was one group that was previously given *pretest* to find out the preliminary condition of the experiment group. After the result of *pretest* was known on that group, then the experiment group is given a treatment symbolized with an (X) (Sugiyono, 2012). The value of *pretest* and *posttest* in the experiment group was then compared and analyzed to see whether there was significant difference or effect between learning model in the experiment group.

The effect of *treatment* (X) can be symbolized with (O2-O1), and the effect is seen based on its significance, i,e, by using parametric or nonparametric statistical test. If there was significant difference between the experiment group, then the treatment given had significant effect that can be illustrated in figure 1, where R was the group chosen *randomly*: X was the *treatment* to be tested; O1 was the *pretest* and O2 = the *posttest* result of the experiment group. The effect of *treatment* (X) can be symbolized with (O2-O1), and the effect is seen based on its significance, i.e. by using parametric or nonparametric statistical test. If there was significant difference between the experiment group, then the treatment given had significant effect that can be illustrated in figure 1, where R was the group chosen *randomly*: X was the *treatment* to be tested; O1 was the *pretest* result of the experiment group and O2 = the *posttest* result of the experiment group.

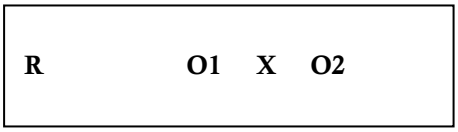

Fig 1. *Pretest-Posttest One Group Design* Research Design

The research was conducted at SDN (State Elementary School) 115 Turangga, Bandung, located at *Jalan Turangga Number 27, Lingkar Selatan, Lengkong, Bandung, West Java 40263.* This research activity was conducted on July 2018. The sampling methohd in this research was total sampling, i.e. using all population of 1st graders in the school, 46 students. The instrument of this research was using questionnaire to measure children's level of knowledge on teeth caries prevention. *Pretest* was conducted as preliminary assessment to find out how far the level of knowledge prior to health education using halma game method on dental and mouth health. Afterwards, *treatment* was given on the group by using halma game method on dental and mouth health.

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The treatment instrument of halma simulation used game board in a form of hexagonal board that contained materials of dental health and teeth caries prevention. After given with the intervention, the sample group received *posttest.* The result, then, was analyzed to find out whether there was a relationship or effect of halma simulation health promotion on the knowledge on teeth caries prevention.

3. Results and Discussions

Teeth caries is a process of local crushing on calcification, started from outside part of the teeth through decalsification process of teeth email layer. It is then followed with organic structural lysis in enzymatic way, so cavity is formed in which if it is not quickly handled, it can go through email as well as dentin and then can reach pulp part (Dorland, 2010). There are various helth promotion methods, i.e. individual and group. Group method health promotion consists of big group and small group.

There are various methods in small group, i.e. group discussion, brain storming, snow balling, buzz group, roleplay and simulation game (Notoatmodjo, 2012).Halma is a very interesting game for school children, where the game has challenges to make strategy. Halma belong to one of the games that are easier to modify and we can insert pictures and materials in that game. *Simulation game* in the form of halma can be used for active and fund learning process (Rusli & Gondhoyoewono, 2012) on a small group as a method of health promotion, especially in teeth health and the steps in brushing the teethproperly for caries prevention.

The population characteristics of this research consisted of 54.3% female and 45.7% male with age distribution shown in table 1, where the most age was 7 years old (76.1%). The result of data analysis as shown in table 2 showed that the children's level of knowledge on teeth caries prevention increased after halma simulation was conducted, and almost all respondents had good level of knowledge (91.3%). The data in this research was distributed abnormally, so in order to analyze whether there was an effect of halma simulation on the knowledge increase of teeth caries prevention, Wilcoxon matched pairs test was used. The result of the test can be seen in table 3 below. There was an increase in number of good knowledge level.This was caused by the enthusiasm felt by the children when attending health promotion while playing. When playing, their senses of sight, hearing, legs and arms also move, so unconsciously the knowledge on teeth caries prevention in the respondents increased. This is in line with the theory, where the knowledge is a human sensing process on certain objects due to most human knowledge is gained through eyes and ears (Notoadmodjo, 2012).

Wilcoxon matched pairs test was used to find out whether the health promotion with halma simulation has effect on the knowledge level on teeth caries prevention based on the results of *pretest* and *posttest.* From the analysis result, p value (*2-tailed*) was less than 0.05 with significance value (.Sig) was 0.013. It can be concluded that there is an effect of halma simulation health promotion on the knowledge level on teeth caries prevention. Based on the research result that I conducted, it is indicated that the children's knowledge lebel on teeth caries prevention at the beginning prior to treatment with halma simulation during *pretest,* the knowledge level of most respondents have been good, i.e. 71.7% even though not all of them, and there are still 28.3% that has adequate knowledge.

Table 1
1st Grade Students' Characteristics of SDN 115 Turangga Bandung

Characteristic	Frequency	Percentage
Sex		
Female	25	54.3 %
Male	21	45.7 %
Age (years old, y.o)		
6	2	4.3 %
7	35	76.1 %
8	9	19.6 %

The knowledge level in *pretest* prior to halma simulation, especially for question group on knowledge (consisting of teeth functions, good teeth characteristics, symptom and signs of teeth

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with hole, causes and prevention of plaque that causes teeth caries) is already good. However, not all children understand especially on what teeth with hole is and the knowledge on teeth caries (questions on ways to prevent teeth caries, factors causing teeth caries, good and bad food for teeth, materials in tooth paste and good ways to brush your teeth). In the application of new caries prevention, only small number of children answer correctly. Among them are the process sequence of how teeth with hole is formed, starting from outer into inner layers, frequency of tooth brushing as well as the good time for brushing teeth, tooth brushing movement, how many rotations in tooth brushing, and visit schedule to dentist.

Table 2
Knowledge Level on Teeth Caries Prevention after Halma Simulation on 1st Grade Students' of SDN 115 Turangga Bandung

Level of Knowledge	Frequency	Percentage
Adequate (56-75%)	4	8.7%
Good (>75%)	42	91.3%
Total	46	100%

The children's knowledge has mostly been good, because previously health promotion has been done by public health center officers on caries prevention and dental health, even though the method used is still lecture method. Besides lecture method, children are also taught on how to brush teeth properly. This activity is conducted 1 to 3 times annually depending on the time availability of the dental nurses. This shows that more than three quarters of the student number still remember the information given to them previously from the dental nurses. There are some weaknesses in this health promotion method, i.e. the application on caries pervention is not deep enough. It only focuses on the ways to bruch teeth and example of differentiating the plaque with *disclosing solution*.

Table 3
Analysis on the Effect of Halma Simulation upon the Knowledge Level of Teeth Caries in 1st Grader Students of SDN 115 Turangga Bandung

Data	Mean	Z	P value
pretest-posttest	7	-2,496	0,013

Beside the lecture method, demonstration on how to brush teeth on the field, where the children follow the officers, several children stiing at the back are busy playing around with their friends, or do not give full attention to the officers because the officers cannot be seen or blocked by their friends who are sitting in the front area.The children's knowledge is not yet deeppp so application and attitude on teeth caries prevention is not yet good, while knowledge is also a base for the formation of an attitude. Someone is deemed lack of knowledge in a condition of not able to recognize, explain and analyze a situation. When the knowledge level is high, then attention on dental health is axpected to be high also, and the other way around (Tulangow, 2013; Sari et al, 2015).

The knowledge level on dental and mouth health is related to the rate of teeth caries event. It is necessary to make effort on improving the knowledge on teeth caries (Ramadhan et al, 2016; Lintang et al, 2015; Norfai& Rahman, 2017). Children in school age is very active in learning anything in their environment so the push to find out and do something on the environment is very big. This is why a child is easy to be guided, directed and taught with good habit.One of the stimulus that can be utilized in giving children health education is this halma simulation game method.

The increase of correct answers in *posttest* shows that health promotion with halma simulation can improve children's knowledge on teeth caries prevention (Puspitaningtyas et al, 2017). Children's need for playing is very big because their world is the world for playing. When playing, children will learn various things and it is a child right as stated also in the convention on children rights by the UN on 30 November 1999, Article 31 point 1. Playing, in addition, is an activity of self-expression with no pressure, happily and gives benefits in moral, motoci, cognitive, language aspects as well as children social development aspects (Rohmah, 2016*).*

Halma simulation can improve children;s knowledge. This can be seen with their enthusiasm in following the game and paying attention to the materials given. Health promotion on teeth caries is easier to be understood by children when it is packaged with the way to play the game. This is in line with the theory of games where playing games is one of the children development stages that is

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important for children's growth and development (Mutiah, 2010*).*

This halma game has significant effect on children;s learning aptitude because it is packaged with how to play and and fund. It is also one of Educational Learning Tools (APE). The use of APE in educationcan make teaching process faster, increase understanding capability, increase children memory, and increase freshness in teaching (*Ismail, 2009*). Learning activity that is done with self-willingness with no pressure will be more remembered by children, so halma game can improve children's knowledge and understanding on brishing the teeth. Besides that, this game is one of the playing therapy with *cooperative play*, i.e. playing together with a clear rule so the relationship between the relationship between the leader and his/her members is created (*Wong, 2009).*

4. Conclussion

Based on the knowledge theory and those findings above, it can be concluded that developing students' knowledge needs expertise in choosing media, approach strategy and interesting learning method based on the children development stages. This aims to get children's aptitude and understanding capability in knowledge can be maximum. Thus, good attitude towards teeth caries prevention is created. Halma game simulation media can be an option to apply health promotion. It can also help students see and understand that previous materials, that were regarded as regular things, are now important things to pay attention to. Besides the related knowledge on teeth caries prevention, school has also to support in relation to attitude improvement, i.e. policy to limit cariogenic snacks. In SDN 115 Turangga, many cariogenic snacks such as candies, sweet drinks, chocolate etc are still available. It is also recommended to make rules for children to brush teeth after break time.

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