3D Dentobox (Dental Explosion Box 3D) as education media for children caries prevention

Siti Rusdiana Puspa Dewi*, Deratih Putri Utami AF*, Indah Octantia*, Nurul Ifadah*

***Department of Dental Conservation and Endodontics, Faculty of Dentistry Universitas Sriwijaya, Indonesia**

ABSTRACT

Introduction: The most common dental and oral health problem in the world is dental caries. In Indonesia, as many as 89% of children under 12 years old suffered from dental and oral disease. Lack of dental knowledge and awareness can be overcome by conducting intensive dental and health education to the community. 3D Dentobox is a simple three-dimensional game designed to deliver dental and oral health messages, including dental hygiene, ways to overcome dental health problems and some dental games. 3D Dentobox is an educational media prevention of caries in children. **Methods:** The method used was Quasi experiment with the type of pretest and posttest control group design. The sample of this study was 30 children aged 9-12 years old. The research subjects filled out a questionnaire containing information on the level of knowledge, attitudes, and actions in caries prevention efforts followed by outreaching to the media and 3D props Dentobox and was given back the same questionnaire to be filled. Data were collected and evaluated using Guttman scale and was analyzed by paired T test. **Results:** The results showed that the average level of knowledge, changing attitudes, and actions before and after use 3D Dentobox increased significantly ($p<0.05$). **Conclusion:** 3D Dentobox can be used as a media of education to prevent dental caries in children.

Keywords: 3D Dentobox, caries prevention, media education

P-ISSN 1979-0201, e-ISSN 2549-6212 Available from:http://jurnal.unpad.ac.id/pjd/index
DOI:http://dx.doi.org/10.24198/pjd.vol29no2.13604
Submission: May 2017 Publishing: July 2017

INTRODUCTION

The most common dental and oral health problem in the world is dental caries. Dental caries disease is suffered by various age levels, ranging from school-age children to mature age around the world. According to WHO in 2012, 60-90% of school-aged children have dental caries.[1] Based on Health Research of the Ministry of Health Republic of Indonesia (Riskesdas), the prevalence of active dental caries in Indonesia in 2013 reached 53.2%. The results of the survey listed in riskesdas in 2013 showed the percentage of active dental caries in South Sumatera community of 60.2%.[2]

The high prevalence of caries occurred due to the lack of awareness of dental and oral health

Corresponding author: Deratih Putri UAF, Department of Conservative Dentistry, Dental Programme, Faculty of Medicine Univ. Sriwijaya, Indonesia Jl. Dwikora II, Kota Palembang, Sumatra Selatan. Email: deratihputriutami9g@gmail.com

condition. This happened because the lack of education about dental and oral health including ways and time brushing teeth, proper brushing time, eating patterns, and healthy lifestyle.[3]

Improving the awareness of oral hygiene from an early age was important, so dental and mouth disease had not become a chronic disease. Early childhood education is helpful for children to begin to realize the importance of maintaining healthy teeth and be aware of the disease or dental disease in the oral cavity, so that the preventive efforts can be done through familiarizing children and society to maintain healthy teeth and mouth, and increasing public awareness of the importance of maintaining oral health.[4]

3D Dentobox is a simple three-dimensional game designed to deliver dental and oral health messages. It included many educational segments, such as way to choose toothbrush, brushing method, a good time for brushing, how the dental and oral diseases developed, how to solve problems existed in the oral cavity, as well as some other interesting games combined with unique cartoons, puzzles, and guessing games.

Kelurahan Lorok Pakjo, District Ilir Barat I, Palembang City, has a total area of 58 Ha, with 16 Citizens Association (RW), 52 Neighbourhood Associations (RT), and population of 28,738 people, the second densely populated area after Bukit Lama in Ilir Barat II district. As a fairly dense village, it was hoped that the provision of education can reach the target for community service that was good enough for the area and was expected to be done to other areas around to cover the city of Palembang gradually. [5]

The above description directed to conduct study that aimed to analyze the effect of the use of 3D Dentobox as a medium of prevention education of caries in children.

METHODS

The research methods was quasi experimental, by forming pre-test and post-test design to determine the effect of the use of 3D Dentobox (Dental Explosion Box 3 Dimensions) as a media of education prevention of caries in children in the village Lorok Pakjo, District Ilir Barat I, the city of Palembang, South Sumatra Province. There was no comparison group (control) in the design of this study, but the observation of early (pre-test) allowed researchers to evaluate the changes that occur post-education with 3D Dentobox (post-test). Respondents on community service activities were children aged 9-12 years old both male and female. The research was conducted in November 2016.

Methods of activities undertaken started with collecting data using a questionnaire, which included data about children's knowledge about oral and dental health prior to explanation. This preliminary data was used to determine children's knowledge about oral health.

Dental health education in children was conducted by an interactive counselor team for 10-15 minutes, and mass toothbrushing for 15-20 minutes guided by a team of dental health worker was conducted. Afterwards, the children were invited to play along with the 3D dental box (Fig. 1), arranged puzzles, and answered quizzes out of a box of dental applications, followed by giving the award to the children who managed to solve puzzles and quizzes. At the next stage, children were given the same questionnaire to evaluate the level of understanding and knowledge of these children.

Assessment was to assess the results of the sample questionnaire pre and post counseling activities with 3D Dentobox. Knowledge was measured using the Guttman scale. Guttman's method was based on the fact that the relevance of each indicator to a variable was different, in which one or more indicators can measure those variables appropriately.[6] Questions raised amounted to 10 (yes/no) for knowledge and attitude, whereas 6 questions were raised for

Figure 1. 3D Dentobox

action. Each correct answer is given a score of 2 and a wrong answer was given a score of 1. The average of total score was calculated and was then put in category ratings to measure level of student knowledge which was divided into 2 categories that was good and poor.

Data obtained from this study were tested for normality by the Shapiro-Wilk test, followed by a paired T test to see differences in pre-test and post-test using 3D Dentobox media on respondents.

RESULTS

Based on the evaluation results from this research activity, the frequency distribution data of respondents was obtained, as shown in Table 1. Table 1 showed that the number of female respondents was more (60%) than the male respondents (40%).

Data of respondent knowledge level before and after counseling was mentioned in Table 2.

Table 1. Distribution of frequency of respondents by sex

Gender	N	%
Male	12	40
Female	18	60
Total	30	100

Table 2. Knowledge level of respondents before and after being counseled

Level Knowledge	Average		P
	Before	After	
	69.16±7.78	83.7±1.07	0.00

Table 3. Assessment of attitude changes of respondents before and after being counseled

Attitude	Average		P
	Before	After	
	74.34±6.62	83.9±0.08	0.00

Table 4. Action of respondents before and after being counseled

Action	Average		P
	Before	After	
	77.23±8.11	83.77±1.28	0.00

Note: Paired t test, p = 0.05

Table 2 showed the average level of knowledge before being given counseling was 69.16±7.78 and after being given counseling was 83.7±1.07, with $p<0.05$, which meaned that there was significant difference in the level of knowledge before and after being given counseling with 3D Dentobox.

Respondents' attitude before counseling and its change after counseling could be seen in Table 3. Table 3 showed that the average attitude of the respondent before being given counseling was 74.34±6.62 and after being given counseling was 83.9±0.08, with $p<0.05$, which meaned that there were changes in respondents' attitudes before and after being given counseling with Dentobox.

Evaluation of action before and after given counseling could be seen in Table 4. Table 4 showed that the average level of knowledge before being given counseling was 77.23±8.11 and after being given counseling was 83.77±1.28, with $p<0.05$, which meaned that there were changes to responders actions before and after being given counseling with 3D Dentobox.

DISCUSSION

The above data shows there were differences in the level of knowledge, attitudes, and actions performed before and after extension by using a simple 3D Dentobox. Based on this evaluation, it showed that the extension to 3D Dentobox was successful in fostering knowledge, attitudes, and actions relating to children with oral health. This was because counseling was a learning process that was influential in improving knowledge when combined with game. 3D Dentobox was one media of oral health counseling with three-dimensional cube and contained games and important information regarding oral health. This game, in addition to providing information to children, also stimulated the child's motor to play while trying to demonstrate some educational materials in oral and dental health. Inside this box were educational puzzle games, quizzes created a unique, thus stimulating the activity of the child, so that the educational material can be easily remembered and applied by children.[7]

Pratiwi *et al.*[8] conducted a study on the influence of educational game methods and

lecture methods on knowledge, attitudes, and actions about diarrheal disease in elementary school children in Kendari and found that educative game methods were more effective in changing knowledge, attitudes, and actions. This was because the accuracy of the election of the extension methods used in the experimental group matched the characteristics of respondents, i.e. primary school children.[8]

Selection of extension methods was appropriate to the character of the respondents, the use of attractive educational methods, and a fun learning atmosphere, so that it could make respondents more easily to receive the information provided.[8] Hamdalah[9] in his research regarding the effectiveness of media mentioned as snakes and ladders picture story in oral health education of students of SDN 2 Patrang Jember, concluded that there were significant differences between the lecture method using the media and media picture story snakes and ladders game. Game media of snakes and ladders was more effective in an effort to improve knowledge and attitude toward dental and oral health as well as to practice how to brush your teeth properly and correctly.[9]

Levels of knowledge, attitudes, and practices on oral hygiene were higher in the group that had previously got counseling with the snakes and ladders game media than the picture story media groups. This was because children had saturated nature, therefore, in order to invite children to learn, teachers and parents tended to use a variety of props and games as an angler interest in children to learn. Effective learning was not enough to just provide information, but it needed to give an experience that stimulated the motor so that knowledge was easy to remember and apply.[9]

Sumantri *et al*.[10] assessed the change in the level of oral and dental knowledge to students aged 7-8 years in two elementary schools at Bukit tinggi and got that visual games significantly affected a child's knowledge. Visual media was believed to further enhance the motivation of children in the process of education, especially the use of graphic media that poured the message in the form of meaningful writing, letters, pictures, and symbols.

Graphical media included silent visual media as well as other media, graphic media served to distribute the message. Channels used in the sense of vision were poured into interesting and clear symbols. Graphics media was relatively cheap in the procurement and was often used as an educational game in children.[10]

Changing the knowledge, attitude, behaviour and actions of each individual required special skills, because changes in individual behaviour invariably involved mental change. Mental changes in the positive direction lasted longer if introduced at early ages. Changes also occurred planned and implemented systematically. Age-appropriate education was easy to grasp, remember, and apply in everyday life, especially if it had been well introduced in childhood.[11.12]

CONCLUSION

Based on the description of the results above, it can be concluded that the 3D Dentobox can be used as a media of education to prevent dental caries in children and for enhancing the oral health in children.

REFERENCES

1. WHO (World Health Organization). Oral Health. [Serial online]. 2016 [cited 2016 Aug 9] Available from: http://www.who.int/mediacentre/factsheets/fs318/en/.
2. Agency for Research and Development of the Ministry of Health. Basic health research 2013. Jakarta: Ministry of health Republic of Indonesia; 2013. p. 114-8.
3. Rafika R. Relationship evening tooth brushing habits and the incidence of dental caries in children Elementary School Middle Reef 07 Tangerang. (Hubungan kebiasaan menggosok gigi malam hari dan kejadian karies gigi pada anak Sekolah Dasar Negeri Karang Tengah 07 Tangerang) Scientific Forum 2015 Jan;12(1):69-76.
4. Ramadan A, Cholil, Sukmana BI. The correlation between the level of knowledge of oral and dental health on the number of dental caries in SMPN 1 Marabahan (Hubungan tingkat pengetahuan kesehatan gigi dan mulut terhadap angka karies gigi di SMPN 1 Marabahan) Dentino J Dent 2016;1(2):173-6.
5. Palembang Central Bureau of Statistics.

Population Census Data Palembang (Data Sensus Penduduk Palembang) [Online series]. 2016. [cited 2016 Aug 9]. Available from: https://palembangkota.bps.go.id/linkTableDinamis/view/id/24.

6. Windiyani T. Instruments to collect data interval: Nominal, ordinal and data about conditions, circumstances, certain things and data to capture the personality variable (Instrumen untuk menjaring data interval. nominal, ordinal dan data tentang kondisi, keadaan, hal tertentu dan data untuk menjaring variabel kepribadian) J Basic Educ 2012;3(5):203-8.
7. Stetzik L, Deeter A, Parker J, Yukech C. Puzzle-based versus traditional lecture: comparing the effects of pedagogy on academic performance in an undergraduate human anatomy and physiology II lab. BMC Med Educ 2015;15:107.
8. Pratiwi DA, Junia N, Erawan PEM. Effect of extension methods of educational games and a lecture on knowledge, attitudes and actions on the prevention of diarrheal diseases in primary school pupils in the district of the city of Poasia Kendari 2015 (Pengaruh penyuluhan metode permainan edukatif dan metode ceramah terhadap pengetahuan, sikap dan tindakan tentang pencegahan penyakit diare pada murid SD di Kecamatan Poasia kota Kendari tahun 2015) UNIDPU J 2016;2(1):1-12.
9. Hamadalah A. Effectivity of snakes and ladders picture media story in oral health education of students of SDN 2 Patrang Jember (Efektivitas media cerita bergambar dan ular tangga dalam pendidikan kesehatan gigi dan mulut siswa SDN 2 Patrang Kabupaten Jember) J Promkes 2013;1(2):118-23.
10. Sumantri D, Lestari Y, Arini M. Influence of the level knowledge cganges of tooth and mouth health on students age 7-8 years in two elementary schools at Selayang city Mandiangin district Bukittinggi through dental game education (Pengaruh perubahan tingkat pengetahuan kesehatan gigi dan mulut pada pelajar usia 7-8 tahun di 2 Sekolah Dasar kecamatan Mandiangin kota Selayang Bukittinggi melalui permainan edukasi kedokteran gigi). Andalas Dent J 2013;1(1):39-48.
11. Simons D, Baker P, Jones B, Kidd EAM, Beighton D. Dental health education: An evaluation of an oral health training program for carers of the elderly in residential homes. Br Dent J 2010;188:206-10.
12. Poernomo SD. Dental health education method. A scientific and technological dentistry (Metode pendidikan kesehatan gigi). Jakarta: Faculty of Dentistry UPDM; 2007;4:65-6.