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Effectiveness of dental health education using cartoons video showing method on knowledge and oral hygiene of deaf children in Yayasan Karya Murni Medan

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Abstract
World Health Organization (WHO) in 2007 estimated the number of children with disability in Indonesia approximately 7 % of the total number of children aged 0-18 years. Childrens with disability like deaf children have difficulty in maintaining their oral hygiene because of the low ability of muscle movement, muscle weakness, and lack of muscle movement which affect routine procedure in taking care of their oral hygiene. The aim of this study was to know the effectiveness of dental health education using cartoon video showing method on knowledge and oral hygiene of deaf student before, after and a week after dental health education. A clinical experimental study was conducted with pre and post-test group design. Sample were 92 deaf children aged around 10-15 years at Yayasan Karya Murni Medan. The dental health education using cartoon video showing method that use a sign language in such a ways so it can be understood by the deaf children. Knowledge score was measured using questionnaire dan oral hygiene score was measured using OHIS index. Initial knowledge and oral hygiene score measured at day 1 and then give them dental health education using the cartoon video showing and training how to brush the tooth properly and measured again at day 2. Dental health education with cartoon video keep being played for a week before the class started, then measured again at day 8. To analyze the differences of knowledge and oral hygiene score before, after and one week after dental health education with paired t test. The Results showed that the level of the knowledge increased significantly from 7,73±0,38 before education to 10,75±0,42 after education, and risen to 14,23±0,30 one week after education (p=-0,000). There was significant differences of oral hygene score before 2,75±1,33, after 1,90±1,37 and a week after dental health education 1,46±1,08 (p=0,000). Dental health education using cartoon video showing method are effective in increasing knowledge and decreasing oral hygiene score in deaf children.

Keywords: dental health education, knowledge, oral hygiene, deaf children

1. Introduction
World Health Organization in 2007 estimated the number of children with special needs in Indonesia was approximately 7% from the total number of children aged between 0-18 years. Based on data from the Central Bureau of Statistics in 2010, presenting that deaf population was quite large, estimated at 1.25% of the total population of Indonesia in 2010, or about 2.9625 million inhabitants, included big number of deaf population, there were children that required special management and received the proper education to the needs of deaf children (Astoeti, 2006) [1].

Deaf or hearing impairment is a disability sense of hearing. Some children are born with hearing loss, either partially or in its entirety. The etiology of hearing impairment associated with hereditary factors and some are obtained via disease, drugs and trauma (Herijulianti, 2001) [6].

According to the definition of hearing impairment is a condition in which individuals are not able to hear, and it can be seen in speech or other sounds in both the degree of frequency and intensity.

Cartwright and distinguishes between deaf or hearing impairment with hearing difficulties where hearing impairment is a hearing loss that is either permanent or fluctuating, affecting the academic achievement of children but doesn't fall into the classification of deafness (US Office of Education, 1977, p. 42-48). Meanwhile, deafness is defined as severe hearing loss that the child has difficulty in processing information on the language through hearing, with or without tools, thereby disrupting the educational achievement (Respathy, 2003) [9].

Health Research Association in 2007 reported that the prevalence of active caries at the age of 12 years was 29.8%. Research conducted by *Jain et al* (2008) in India resulted a very high prevalence of dental caries in adolescents with hearing loss (Maulana 2009) [8]. Study done by Roe *et al* stated that the high caries occurred in children with special needs because they had difficulties in maintaining oral hygiene, lack of ability to move muscles, muscle weakness, and they had minimal movement of mouth muscles that affected the routine procedures in brushing their teeth (Sulaiman, 2010) [10].

Children with hearing loss or hearing impairment often create problems of its own. The main problem in children with hearing loss is a problem in communication because they have limitations in sense of hearing. Speech problem occurs because a child cannot learn the relationship between the movements of the mechanisms involved until the process is generated. In communicating, hearing impaired children get into trouble because of the inability to capture and convey a problem, till dental health education is given through a demonstration on how to brush teeth (Respathy, 2003) [9]. Demonstration is a way of combining stories and motion that are adapted to reality (Astoeti, 2006) [1].

In planning the educational program, the techniques are adjusted with the age group (Herijulianti, 2001) [6]. Selection of appropriate methods that facilitates the learning process will ultimately improve the knowledge (Astoeti, 2006) [1]. Especially in children with hearing impairment, the dentist needs to have the ability to interact with them so that the dental health care and education provided will be conveyed and practiced during brushing teeth. (Astoeti, 2006) [1].

According to Notoatmodjo, dental health education aims to increase the empowerment of individuals and communities to achieve betterment of dental health in the future. Education program must be made as attractive as possible, without reducing the contents.

In order to improve oral health knowledge among the students, dental health education with effective methods will attract and maximize the uses of the senses of the students. Eyes are the most dominant senses of deaf children. It is very important in determining dental health education methods that are visually intended for deaf children who tend to use sight senses to receive an information. (Hartini, 2010) [4].

Playback video cartoons or animated movies are able to provide visual displays that are more powerful than abstract information. It plays a role to improve the quality of learning process and outcomes. Utilization of animated films in learning can improve thinking ability and positively influences on students' motivation. Thus, this method is able to help individuals to save 90% of what he reads, hears, sees, and says. With the use of video cartoons for dental health education hoping that the messages delivered can be remembered as much as possible so that it can affect the behavior (Hartini, 2010) [4].

Method of playback video cartoons is capable of giving a great impact in the field of communication and education because this method can integrate text, graphics, animation, audio, and video. Media video cartoons have developed the process of teaching and learning towards a more dynamic and effective way. Under these conditions, a cartoon video playback method can be used for dental health education. In addition, the education allows the material more interesting, interactive, easy to understand through visualization that include text, images, sound, video, and animations or movies (Maulana 2009) [8].

This cartoon video playback has changed the paradigm of learning to read, see, hear, and observe (Maulana 2009) [8]. Quite a lot of positive effects of video cartoons play in the child's personality, as a cartoon videos aims to give lessons to children because childhood is the period of imitation. Children tend to imitate what he sees till positive impact is seen on the video cartoons can be applied in everyday's life. The weakness of this medium are: relatively using large costs, necessary preparation, and necessary skills to operate it.

Cognitive and knowledge are very important domain in shaping a person's actions. From experience and research proved that behavior based on knowledge will be more meaningful than the behavior that is not. (Hadnyanawati, 2007) [3].

Based on the description above, the writer is interested in performing dental health education using video playback cartoon created in such a way to use sign language so that deaf students can understand the level of knowledge and oral hygiene score at Yayasan Karya Murni Medan. We hope this research will improve the knowledge and ability of deaf students to brush their teeth properly and provide feedback to the parents of deaf students and school administrators to pay more attention to oral hygiene among the students to perform routine programs of oral health with a cartoon video playback so that deaf students can maintain the oral hygiene without the help of others and this can prevent oral diseases, especially caries.

Materials and Methods

The research is a clinical experiment with pre and posttest group design. The population was deaf students of SLB Karya Murni Medan with the total of 360 students. Samples were deaf children aged 10-15 years which was up to 92 people. Dental and oral health education was given in the form of video playback cartoon played in such a way by using sign language, followed by a demonstration of how to brush teeth correctly. The material in education was the number of teeth of children and adults, type, shape and function of each of the teeth, cause of cavities, cause due to the lack of brushing, snacks should be reduced, the frequency and right time to brush teeth, the type and amount of toothpaste used, type of bristles and storing toothbrushes, when to replace toothbrush, the right brushing technique, how to hold a toothbrush and regular visits to the dentist. Knowledge of deaf students was measured through a questionnaire containing questions about the subject. Oral health knowledge was measured through a questionnaire with 19 questions. If the correct answer was given a score of 1 and if the wrong answer was given a score of 0, so that the highest value was 19. If the score of respondents correctly answered 76% -100% of the whole question then considered good. If the score of the respondents correctly answered 56% -75% of the whole questions then categorized enough. If the score of respondents correctly answered <55% of the questions then categorized bad. Knowledge category:

- Good if the score 15-19
- Enough if the score 11-14
- Bad if the score <11

Oral hygiene scores was measured using Oral Hygiene Simplified Index (OHIS) which is the sum of the debris score and calculus score. OHIS introduced by Greene and Vermillion in 1964. The index measures the area of the tooth surface which is covered by debris or calculus. Dental indices used for the inspection of OHI-S is 4 posterior teeth and 2

anterior teeth. The examined Maxilla are the buccal surface M1 upper right tooth, labial surface of the tooth surface I1 upper right and upper left M1 buccal teeth. The lower jaw that is checked is the lingual surface of the tooth lower left M1, labial surface of the tooth surface I1 bottom left and bottom right lingual tooth M1.

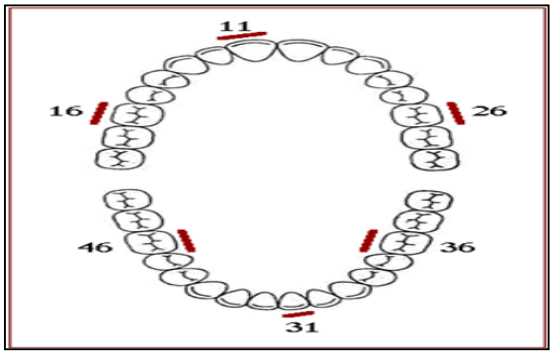

Fig 1: Teeth that were examined with OHI-S index. (Tayanin, 2014)

Debris index is a score of soft sediment that occurs because of food impaction on specific tooth. Calculus index is a score of hard deposits (tartar) occurs due to calcification of debris attached to the teeth. 15 examinations are done by placing the sonde at 1/3 incisal or occlusal and later moved toward the 1/3 gingival. Score criteria for debris index (Tayanin, 2014):

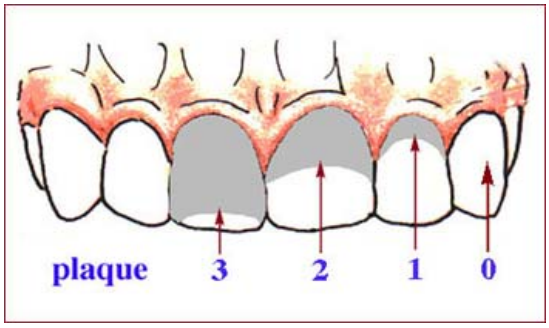

Fig 2: Criteria for classifying debris

Table 1: Criteria for classifying debris

Scores	Criteria
0	No debris or stain present
1	Soft debris covering not more than one third of the tooth surface, or presence of extrinsic stains without other debris regardless of surface area covered
2	Soft debris covering more than one third, but not more than two thirds, of the exposed tooth surface.
3	Soft debris covering more than two thirds of the exposed tooth surface.

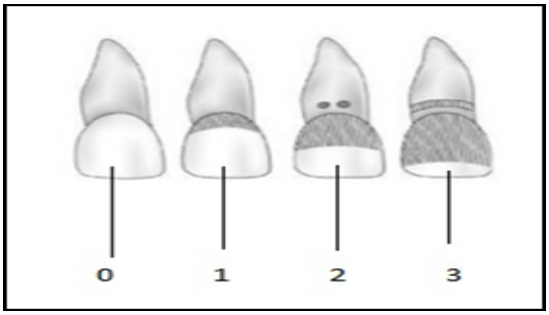

Fig 3: Criteria for classifying calculus

Table 2: Criteria for classifying calculus

Scores	Criteria
0	No calculus present
1	Supragingival calculus covering not more than third of the exposed tooth surface.
2	Supragingival calculus covering more than one third but not more than two thirds of the exposed tooth surface or the presence of individual flecks of subgingival calculus around the cervical portion of the tooth or both.
3	Supragingival calculus covering more than two third of the exposed tooth surface or a continuous heavy band of subgingival calculus around the cervical portion of the tooth or both.

Debris and calculus index obtained from the total score of 6 teeth examined divided by the number of teeth examined. OHIS = Debris index + Calculus. Sum of debris index and calculus index will results in OHI-S criteria of an individual.

Table 3: OHI-S criteria

Score	Category
0 - 1,2	Good
1,3 - 3,0	Moderate
3,1 – 6	Bad

Procedures

1. Measurement of score in knowledge and examination OHIS scores (Baseline / Before education) (measurement I / Day I)
2. Gave dental health education using the video cartoons and trained on how to brush teeth correctly.
3. Measurement of score in knowledge and examination OHIS scores (after education) (measurement II / Day II)
4. Presented dental and oral health education using a cartoon video during the week in a row every day before the lesson started.
5. A week later, measurement score in knowledge and examination OHIS scores is taken (Measurement III / Day VIII).

The data obtained were processed using a computer program and presented in tabular form, then statistical analysis was done to see the difference in knowledge scores and oral hygiene before, after, and one week after the education with cartoon media presentation using paired T test.

Results and Discussion

The percentage of male students with hearing impairment is 52.17% more compared to female students that was 47.83%. 43.48% of respondents mostly aged between 12-13 years old while the age of 10-11 years and 14-15 years, respectively 28.26% (Table 4).

Table 4: Characteristics of respondents students of Yayasan Karya Murni SLB-B (n = 92)

Characteristics of respondents	Total (n)	Percentage (%)
Gender		
Male	48	52.17
Female	44	47.83
Age (Years)		
10 – 11	26	28.26
12 – 13	40	43.48
14 – 15	26	28.26

The average score of respondents knowledge increases, that is before the education is 7.73 ± 0.38, a day after the education

is 10.75 ± 0.42, and a week after the education is 14.23 ± 0.30.This is in accordance with Damafitra's research that examines the effectiveness of video and sign language as a medium of health education to increase knowledge on oral health among children with hearing impairment, in which there is an increase in oral health knowledge after the education. The best education method for children with hearing impairment is audiovisual method, which is using visual media like documentaries or animations to explain an event as real as possible. Another factor that increases knowledge among children with hearing impairment is more and continuous motivation towards them, as stated by Doichinova *et al* in his research that is oral health education using media videos media is more effective compared to written instruction method and it should be conducted continuously. According to presentation of images and words that are colorful in the videos has an influence on the increase of knowledge, where the colors have strong influence on short-term memory and visual attention (Table 5)

Table 5: The mean score of knowledge at baseline, a day and a week after education by screening cartoon videos at SLB Karya Murni school (n = 92)

Sample group	Knowledge score ($\dot{x} \pm SD$)
Baseline	7.73 ± 0.38
A day after education	10.75 ± 0.42
A week after education	14.23 ± 0.30

The average OHIS score of respondent decreases before the education from 2.75 ± 1.33 to a day after the education is 1.90 ± 1.37, and a week after education is 1.46 ± 1.08. This is in accordance with the results from Doichinova *et al* research who conducted survey on 100 children with hearing impairment, where there is a decrease in the average OHIS score before and a week after being given education that is 0.13 ± 0.09. The decrease is likely the result from repeated education so that information about correct way of brushing teeth into a good habit for children with hearing impairment. Eyes are the most dominant senses of children with hearing impairment. Hence, it is very important to determine dental health education methods that are visually intended for children with hearing impairment who tend to use the visual senses to receive information (Hartini, 2010) [4]. Utilization of animation films in learning can improve thinking ability and provide positive influence on student's motivation towards studies. Therefore, one can save 90% of what he reads, hears, sees, and calls. With the use of cartoons video for dental health education, it is expected to deliver messages that are able to be remembered as much as possible which can affect the behavior (Hartini, 2010) [4] (Table 6).

Table 6: OHIS score at baseline, a day after and a week after education with a cartoon videos at SLB KaryaMurni school (n = 92)

Sample group	OHIS Score ($\dot{x} \pm SD$)
Baseline	2.75 ± 1.33
A day after education	1.90 ± 1.37
A week after education	1.46 ± 1.08

Statistical analysis shows there is a significant increase in knowledge score deviation that is from 0.04 ± 3.02 before and a day after the education to 6.5 ± 0.08 before and one week after the education. (Table 7)

Table 7: Difference in average knowledge scores between baseline - a day after and baseline – a week after education using cartoon videos at school SLB KaryaMurni school (n = 92)

Sample group	Knowledge score deviation ($\dot{x} \pm SD$)	Statistical analysis test
Baseline – A day after	3.02 ± -0.04	p = 0.000
Baseline – A week after	6.5 ± 0.08	p= 0.000

Statistical analysis shows there is a significant decrease in OHIS score deviation from -0.04 ± 0.85 before and a day after the education to 1.29 ± 0.25 before and a week after the education through media videos. (Table 8)

Table 8: Difference in average OHIS score between baseline – a day after, and baseline - a week after education using cartoon videos at SLB KaryaMurni school (n = 92)

Sample group	Deviation OHIS score ($\dot{x} \pm SD$)	Statistical test results
Baseline – a day after	0.85 ± -0.04	p = 0.000
Baseline – a week after	1.29 ± 0.25	p = 0.000

Conclusion

There are significant differences (p = 0.000) on knowledge score and OHIS before, after and a week after the dental and oral health education to the students with hearing impairment using screening of cartoon videos created in such way using sign language. It can be concluded that dental and oral health education using cartoon videos effective in improving the knowledge and decrease the OHIS score on the students with hearing impairment.

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