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**THE EFFECTIVENESS OF VIDEO DENTAL HEALTH EDUCATION
SPECIAL NEEDS CHILDREN ON THE ORAL HYGIENE STATUS**

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ABSTRACT

Background. The clinical oral cavity characteristics of children with intellectual disabilities include a high prevalence of periodontal disease and dental caries. South Kalimantan is a wetland or marsh that contains acidic water with a pH of 3.5-4.5. The acidic condition causes tooth demineralization, which can lead to caries. Oral health education through special needs children dental health education (DHE) interactive video is needed. **Objective.** Analysing the effectiveness of dental health education (DHE) video media for special needs children living in wetlands during the Covid-19 pandemic on the oral hygiene status of children with intellectual disabilities. **Methods.** The study used a quasi-experimental design with a pretest, posttest without control design and using a simple random sampling technique. The samples were 52 children with intellectual disabilities who were subjected to the OHI-S examination before watching a DHE video for children with intellectual disabilities made by the author as a pretest. Afterward, the children were instructed to watch a 5-minute video made by the author using the Makaton method. Posttest involved OHIS reexamination after watching the video for 20 consecutive days. Data were analysed using the Wilcoxon statistical test. **Results.** There were 29 children with fair OHI-S (55.8%), 15 with poor OHI-S (28.8%), and 8 with good OHI-S (15.4%). The result of the Wilcoxon test indicated a value of 0.000 ($p < 0.05$). **Conclusion.** OHI-S score before the DHE video treatment was fair and improved to good after the DHE video. DHE video can increase the OHI-S in children with intellectual disabilities.

Keywords: Covid-19, Dental Health Education Video, Oral Hygiene Index Status, Special needs children video.

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INTRODUCTION

The American Association of Mental Deficiency (AAMD) defines children with intellectual disabilities as children with mental retardation with average intellectual, thus cannot fully utilize their physical, mental, and social abilities. Intellectual disabilities are classified into four categories, based on Intelligence Quotient (IQ): mild (IQ 50-70), moderate (IQ 35-50), severe (IQ 20-35), and

profound (IQ under 20-25). Clinical characteristics of the oral cavity that can be found in children with intellectual disabilities are a high prevalence of periodontal disease and dental caries. Poor oral health can reduce the ability to eat, negatively impact the aesthetics and cause pain for special needs children. A wetland is a marsh with water acidity of pH 3.5 – 4.5. The water content in South Kalimantan wetlands is acidic and contains cariogenic

bacteria, including *Streptococcus, sp.* Severe dental caries in children with intellectual disabilities are often referred to the dental office with an accumulation of untreated dental problems. The Covid-19 pandemic requires postponing dental checkups, except for emergency conditions.^{1,2,3}

Children with intellectual disabilities have limitations in performing self-care, including maintaining oral hygiene and oral health. Oral problems in children with intellectual disabilities include gingivitis, periodontitis, rapid dental caries, untreated caries can cause abnormalities in the lymph nodes, treatment of enlarged lymph nodes is based on the cause. In general, chronic lymphadenopathy treatment can be given antibiotics, anti-inflammatory, antipyretic treatment. Meanwhile, dental treatment during the Covid-19 pandemic can only involve emergency cases, such as unbearable pain, swollen gingiva, uncontrollable bleeding, and trauma to the teeth and facial bones that might hinder the airway. Most parents living in wetlands often use the water from the wetland for daily use, such as gargling after brushing their teeth. The wetland is a marsh with water acidity of pH 3.5 – 4.5. The water in South Kalimantan wetlands contains cariogenic bacteria, including *Streptococcus, sp.*^{3,4,1,5}

Data from the World Health Organization (WHO) showed that 10% population of special needs children in developed countries and 12% in developing countries. Oral health problems encountered in children with intellectual disabilities include gingivitis, periodontitis, and rapid dental caries. Meanwhile, the Covid-19 pandemic limits dental treatment in emergencies only, such as unbearable pain, swollen gingiva, uncontrollable bleeding, and trauma to the teeth and facial bone that can hinder the airway.^{6,22,3}

Dental Health Education (DHE) is providing information on a comprehensive understanding of oral health and the determining factors that affect individuals and the community. DHE to children should be carried out appropriately and effectively. The wetland is a marsh with a water acidity level of pH 3.5 – 4.5. The water in the South Kalimantan wetland contains cariogenic bacteria, including *Streptococcus, sp.* Therefore, education on the utilization of wetland water for daily use is needed.^{1,7,5}

Interactive video media in the form of cartoons or animation have many benefits as a learning medium for children with moderate intellectual disabilities. The video contains steps

in maintaining oral health so that the children can observe and practice after they understood the activities. Listening only has a different understanding level compared to seeing and listening. Therefore, a good education medium for children with intellectual disabilities is interactive video media.^{1,8,9}

Video media in the form of cartoons or animation have many benefits as a learning medium for children with mild to moderate intellectual disabilities. This learning medium contained a simple and interesting approach to conveying knowledge and skills so that the children are not bored while learning how to self-care. This animation video is beneficial to teach DHE to children. To determine the success of animation video in increasing tooth brushing skills in children with intellectual disabilities, different learning strategies were used, i.e., classical and using individual practice and games. Learning through video showed an increase in students' understanding regarding skills in oral hygiene maintenance. The use of learning videos is expected to attract the attention of children with intellectual disabilities so that they can absorb and understand better.^{9,11,10}

Measurement of oral hygiene is an effort to determine an individual's dental hygiene condition. Oral hygiene can be measured using the Oral Hygiene Index-Simplified (OHI-S), which is scored based on debris and calculus. The main factor affecting oral hygiene in developing countries is healthy behaviour. An Individual's oral hygiene is determined by their behaviour. High knowledge of oral health will affect their behaviour in maintaining oral hygiene. Based on the background of the problem above, the objectives of this research are analysing the effectiveness of dental health education (DHE) video media for special needs children living in wetlands during the Covid-19 pandemic on the oral hygiene status of children with intellectual disabilities.

MATERIALS AND METHODS

The first step of the study was obtained ethical clearance number 074/KEPKG-FKGULM/EC/VII/2022 before starting to research. This study used a quasi-experimental with non-equivalent without a control group (non-randomized without a control group pretest-posttest) design. This is a follow-up study from last year's study on parent education program on the use of Dental Health Education (DHE) animation video for children with intellectual disabilities which showed that the role of parents in maintaining the oral health of

children with intellectual disabilities using a DHE animation video made by authors had an impact. Therefore, a follow-up study by examining the Oral Hygiene Index-Simplified (OHI-S) of children with intellectual disabilities before and after watching the Dental Health Education (DHE) animation video. Fifty-two children with mild to moderate intellectual disabilities (IQ 70-40) aged 7-23 years old in Bhakti Luhur Foundation Banjarmasin were chosen as samples. The inclusion criteria were children with mild to moderate intellectual disabilities (IQ 70-50), aged 7-23 years old, living in the wetland, and able to brush their teeth without the help of parents/caregiver.

The OHI-S score of children with mild to moderate intellectual disabilities was tested as a pretest before they were given a DHE animation video for special needs children living in wetlands to prevent dental caries during the Covid-19 pandemic. Afterward, counselling on DHE for special needs children living in wetlands to prevent dental caries during the Covid-19 pandemic using a premade animation video, i.e., a modified Makaton method in the form of children's song using symbols on how to choose the correct toothbrush and toothpaste, how to properly brush teeth, good and bad about the foods-drinks for the teeth combined with study dental model's to visualize DHE. Subsequently, a demonstration of how to choose the correct toothbrush and toothpaste, how to properly brush teeth independently, and how to choose foods and drinks that are good for the teeth through images was carried out to strengthen the memory of the information conveyed to children with intellectual disabilities.

The final evaluation was an observation as a posttest after 20 days of education to the children. The investigators reexamined the OHI-S of the samples. Behaviour management of tell-show-do or modelling was carried out before the OHI-S examination for scared children. The examination was carried out by instructing the children to tilt their heads up, gargle with chlorhexidine, then open their mouths. Debris and calculus index were examined using a mouth mirror and explorer to the buccal surface of 16 and 26, labial surface of 11 and 31, and lingual surface of 36 and 46. The examination was performed by placing an explorer on the incisal or occlusal third of the tooth surface and moving it to the gingival or cervical third. The score was recorded on the examination sheet, then measured and categorized as good, fair, and poor. The results

were recorded and analysed with the Wilcoxon non-parametric test.

RESULTS

The Results effectiveness of dental health education (DHE) videos for children with special needs on dental and oral hygiene status shows:

Table 1. Characteristics of children with intellectual disabilities based on IQ

IQ	Number of Children (N)	Percentage (%)
40-55	16	30.8%
55-75	36	69.2%
Total	52	100%

Table 1 indicated that 16 children had an IQ of 40-55, which was considered moderate intellectual disabilities, and 36 children with an IQ of 55-75, which was considered mild intellectual disabilities.

Table 2. Dental Health Education (DHE) video learning on children with intellectual disabilities

Learning	Number of Children (N)	Percentage (%)
Good	6	11.5%
Fair	35	67.3%
Poor	11	21.2%
Total	52	100%

Table 2 showed that 6 children had good learning from Dental Health Education (DHE) video, 35 children had fair, and 11 had poor results.

Table 3. Pretest OHI-S of the oral cavity of children with intellectual disabilities

OHI-S	Number of Children (N)	Percentage (%)
Good	5	9.6%
Fair	31	59.6%
Poor	16	30.8%
Total	52	100%

Table 3 presented the results of pretest OHI-S with 5 children showing good OHI-S, 31 children showing fair OHI-S, and 16 showing poor OHI-S.

Table 4. Posttest OHI-S of the oral cavity of children with intellectual disabilities

OHI-S	Number of Children (N)	Percentage (%)
Good	8	15.4%
Fair	29	55.8%
Poor	15	28.8%
Total	52	100%

OHI-S was also examined on the children after providing education. Table 4 presented the results of posttest OHI-S with 8 children showing good OHI-S, 29 children showing fair OHI-S, and 15 children showing poor OHI-S.

Table 5. The result of the Wilcoxon test on the effectivity of Dental Health Education (DHE) for special needs children living in wetlands during the Covid-19 pandemic learning video on the oral hygiene status of children with intellectual disabilities.

		Ranks		
		N	Mean Rank	Sum of Ranks
Posttest_OHI-S - Pretest_OHI-S	Negative Ranks	5 ^a	9.20	46.00
	Positive Ranks	42 ^b	36.76	439.00
	Ties	0 ^c		
	Total	52		
Test Statistics ^a				
Z			Posttest_OHI-S - Pretest_OHI-S	-2.837 ^b
Asymp. Sig. (2-tailed)				.000

a. Wilcoxon Signed Ranks Test
 b. Based on negative ranks.

Wilcoxon test showed a p-value = 0.000 (p < 0.05), which means there is a significant statistical difference between pretest OHI-S and posttest OHI-S.

DISCUSSION

This study involved 36 children with an IQ between 55-75 which is in the mild category, and 16 children with an IQ between 40-55, which is in the moderate category. Children with mild intellectual disabilities can still learn to read, write, and do simple counting. They can still be guided and educated academically. Children with an IQ between 40-55 were considered moderate intellectual disabilities. They had difficulties performing academic activities such as writing, reading, and counting. In daily life, children with moderate intellectual disabilities can be educated with continuous guidance.^{12,13,14}

The most suitable education media for children with intellectual disabilities is video media. Children with intellectual disabilities require an education medium that can focus their attention compared to normal children. This medium should have a high impact on the senses for better understanding. Through video,

they not only listen to education, but also see and listen to education presented using the Makaton method, which is a communication method using signs and symbols made for people with intellectual disabilities. Therefore, this method can help them to receive information on oral health counselling. This modified method can be used to educate on how to brush teeth. The Makaton method was modified by adding children’s songs using symbols explaining the areas of teeth that need to be brushed in the form of an animation video. The video was combined with props to visualize the areas to be brushed, followed by a demonstration on how to brush teeth independently to strengthen the memory of the conveyed information.^{15,16}

The most common oral health problems found in children with intellectual disabilities include gingivitis, periodontitis, and dental caries. Children with intellectual disabilities experience the rapid progress of periodontal disease which leads to early loss of teeth. They also have a higher incidence of dental caries. Oral health problems in children with intellectual disabilities can cause problems to the masticatory system. Problems in the

masticatory system can hinder the process of nutrition intake, which can cause malnutrition.⁵

Yayah Sopianah, *et al.* (2017) concluded that tooth brushing counselling using video media is effective in improving the knowledge and behaviour of children with learning delays. Gigih Putriani (2017) suggested the use of animated video to educate tooth brushing to children with moderate intellectual disabilities in Negeri Pembina Special School Yogyakarta can improve their ability to brush their teeth. Readilkha Perwidananta (2016) stated a significant difference in independent tooth brushing ability in children with intellectual disabilities from Harmony Special School Surakarta before and after counselling using the Makaton method. Several studies show that video is a good medium to provide education to children with intellectual disabilities. The advantage of this video medium is that it can be repeated as needed to improve clarity and provide appropriate stimulus according to the objectives and responses that the children expected.^{17,10,18}

The Wilcoxon statistical test result showed a significant difference of OHI-S scores in children with intellectual disabilities before and after being educated with a video medium. OHI-S is an index describing oral hygiene. OHI-S consists of two measurement indices of debris and calculus. Oral debris is a soft substance found on tooth surfaces, which can be in the form of plaque, materia alba, and food debris. Calculus is a calcified mass that firmly attaches to the tooth surface. Plaque contains more than 325 species of different bacteria. One gram of the plaque contains around 2×10^{11} bacteria. These bacteria are cariogenic that can cause dental caries and periodontal disease.^{19,20}

This study showed that the use of a video medium to improve oral hygiene in children with intellectual disabilities in wetlands was effective. People in South Kalimantan use acidic water from the wetlands to drink and brush their teeth. This can lead to tooth demineralization, which in turn causes caries.^{2,21}

Therefore, the use of educational media based on video is effective to prevent several oral diseases in children with intellectual disabilities in wetlands. The OHI-S score of children with intellectual disabilities before been given a DHE video was in the moderate category and improved to the good category after being exposed to a DHE video. The DHE video for special needs children can improve the OHI-S score in children with intellectual disabilities.

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