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The Use of Pop-up Book for Children with Mental Disabilities towards Increasing Knowledge of Dental and Oral Health

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ABSTRACT

Background: Children with intellectual disabilities often found to have problems with their oral health, such as plaque and debris build-up, poor oral hygiene and caries. This is due to limitations influenced by several factors on motor characteristics, food and beverages that are usually consumed and on minimal knowledge. The problem that the researcher found was the high plaque index in SLB B-C Optimal and SLB Kumara II. **Object:** The purpose of this study was to determine the changes in knowledge about oral health in children with intellectual disabilities using pop-up book media in SLB B-C Optimal Surabaya and SLB AKW Kumara II Surabaya. **Method:** The method used by researchers to collect data using questionnaires before and after counseling with pop-up book media. The type of research used was Pre-Experiment with One-Group Pretest-Post test design involving 44 children with disabilities. **Results:** The results of data analysis with the Wilcoxon test obtained sig = 0.000 which means smaller than α 0.05. The conclusion of this study is that there is a difference in increasing knowledge about dental and oral hygiene before and after being given counseling using pop-up book media for SLB B-C Optimal Surabaya and SLB AKW Kumara II Surabaya.

Keywords: Oral Health, Pop-up Book, Intellectual Disability

BACKGROUND

Individuals with intellectual disabilities tend to have a relatively high plaque index. This occurs because they are less able to maintain proper oral hygiene due to their limitations. Other contributing factors include limited skills in removing dental plaque, consumption of cariogenic foods and beverages, and the lower IQ levels of children with intellectual disabilities, which affect the behaviors they form. As a person's IQ increases, their ability to understand information also increases (Shoumi et al., 2023). Oral hygiene among individuals with intellectual disabilities is categorized as low because they experience difficulties with oral cleaning procedures (Fadhilah et al., 2021).

According to data Riskeddas (2018), the prevalence of people with

disabilities is 3.3%, of which 13.68% have intellectual disabilities. Research Anandya et al., (2019) showed that all subjects who have intellectual disabilities had plaque index values categorized as poor. A similar study (Dirman et al., 2023) reported a mean plaque index score of 4.79 (categorized as poor) among individuals with intellectual disabilities. According to (Suyami et al., 2019), children with intellectual disabilities are at high risk of oral health problems because their mental limitations lead to suboptimal oral cleaning.

Children with intellectual disabilities are less able to clean their own teeth and mouths properly, making them more susceptible to oral health problems. Individuals with disabilities have twice the risk of oral health problems compared to the

general population. This can be seen from the presence of organic debris in the mouth, such as thin layers of biofilm, food remnants, and dental plaque (Fuadah et al., 2023). Knowledge of oral and dental health at school must be carefully considered, as school age is a developmental stage that influences later life, including dental health. One method to increase knowledge about health is through counseling (Zahro et al., 2023). Intellectual disability (tunagrahita) refers to people with intellectual abilities lower than the majority of their peers (Yanta & Jon, 2020). Children with intellectual disabilities generally have poor oral hygiene, with a proportion of 62.6% and low levels of related knowledge (Daniati et al., 2022). Poor oral hygiene can be detected by observing accumulation of plaque and calculus in the oral cavity, which are etiological factors for periodontal disease.

Delivering educational material during counseling requires appropriate media. Media intended for children with intellectual disabilities should be concrete and tailored to their characteristics, since they have difficulty understanding abstract concepts. Concrete media can facilitate learning for children with intellectual disabilities, making it easier for them to understand and apply the information in daily life (Halimah et al., 2019). Instructional media are an important indicator of learning success, intended to motivate students during teaching and learning processes (Widyarani et al., 2020).

The use of attractive multimedia learning media can create comfort and enjoyment for students during learning, making them more interested in learning new topics (Ahdan et al., 2020). It is known that SLB B-C Optimal collaborates under Poltekkes Kemenkes Surabaya with the aim of improving dental and oral health, but the plaque index found by Robbi Alhafif Azhari in December 2023 was 3.53, which falls into the poor category.

RESEARCH METHODE

The research design used in this study was a pre-experimental one-group pretest-post test design [14]. Pretest (O1) refers to the initial test before treatment, treatment (X) refers to the intervention given to the experimental group by providing counselling using pop-up book media, and Post test (O2) refers to the final test after the treatment. The study was conducted at two locations: SLB B-C Optimal Surabaya and SLB Kumara II Surabaya, carried out from September 2023 to July 2024. The study population consisted of children with intellectual disabilities at SLB B-C Optimal Surabaya (10 students) and SLB Kumara II Surabaya (34 students), totaling 44 students; a sample size of 40 was obtained using Slovin's formula (Siswa & verdikha, 2021).

Inclusion criteria were: students present in class during the research, being students with intellectual disabilities at SLB B-C Optimal and SLB AKW Kumara II, and students being cooperative during the study. Exclusion criteria were: students who were absent, uncooperative during the research, or who were special-needs children with Down syndrome. The research process began with submitting permission to the principals of SLB B-C Optimal Surabaya and SLB AKW Kumara II Surabaya, followed by coordination with class guardians to determine the time of implementation.

The researchers prepared pop-up book media, questionnaire sheets, and formed a guiding team to assist during the activities. The study involved a total of 40 students divided into several groups, each accompanied by one guide. Activities began with an opening greeting and explanation of objectives, followed by distribution and completion of the pretest questionnaire. Students were then introduced to the pop-up book media, which was explained interactively with the help of a communicator, accompanied by three game slides as evaluation. Next, students completed the post test

questionnaire before the activity ended with rewards and a group photo. Questionnaire data were collected, scored (1 for correct answers and 0 for incorrect answers), and tabulated for further analysis.

Data collection used pretest and post test questionnaires with interviews, and the instruments consisted of questionnaire sheets. The sampling technique was probability sampling using simple random sampling where samples were randomly selected so that every member of the population had an equal chance of being included, using a table (Sarjono & Julianita, 2019). The collected

data were processed to test the hypothesis using SPSS software with the Wilcoxon test. The Wilcoxon test was used to determine differences before and after counseling in terms of knowledge improvement among the subjects (Pamewa et al., 2021). The ethical clearance for this study was issued by Poltekkes Kemenkes Surabaya under No. EA/399/KEPK-Poltekkes_Sby/V/2025.

RESULT AND DISCUSSION

Table 1.
Frequency distribution based on respondents' sex and age

Respondent Characteristics		N	(%)
Gender	Male	27	61,36
	Female	17	38,64
Age	12	1	2,27
	13	3	6,82
	14	8	18,18
	15	5	11,36
	16	12	27,27
	17	5	11,36
	18	4	9,09
	19	2	4,55
	20	3	6,28
	22	1	2,27

Table 2.

Recapitulation of students' knowledge about dental and oral health before the Pop-Up Book media

Knowledge criteria	N	(%)
Good	4	9.09
Fair	17	38.64
Poor	23	52.27
Amount	44	100

Table 3.

Recapitulation of students' knowledge about dental and oral health after the Pop-Up Book media

Knowledge criteria:	Number of Students	(%)
Good	34	76.92%
Fair	6	13.64%
Poor	4	9.09%
Amount	44	100%

Table 4.

Wilcoxon analysis results of the effect of pop-up book media on dental and oral health knowledge among children with intellectual disabilities

Variable	Category			<i>P value</i>
	Good	Moderate	Poor	
<i>Pre-test</i>	4	17	23	0,000
<i>Post-Test</i>	34	6	4	

Discussion

The results of the study showed that the knowledge of children with intellectual disabilities before using pop-up book media was categorized as poor. Similar findings were reported by Suyami et al., (2019), where knowledge among children with intellectual disabilities was low before counseling and pretest results showed most children did not know the correct toothbrushing technique. The researchers observed in the field that children with intellectual disabilities frequently consume candy and chocolate. After being provided guidance with teaching aids, the children better understood the impact of such habits. The researchers believe that when children with intellectual disabilities are taught using supportive media, it can develop their thinking patterns because the media help increase their ability as if they were performing the action directly, which supports the habit of maintaining oral health.

Intellectual disability is characterized by intellectual abilities below

average. Limited knowledge can be a cause of low concern for dental and oral health (Nurjannah, 2024). This is consistent with (Asmawati et al., 2023), who mentioned that knowledge among children with intellectual disabilities is still low regarding proper toothbrushing. This condition arises due to limitations in comprehension, verbal ability, motor coordination, and concentration that make them difficult to direct.

After education using pop-up book media, the understanding of children with intellectual disabilities improved and evaluation results showed better outcomes compared to before the intervention. These findings align with Mayangsari (2023), which stated that pop-up books, as attractive three-dimensional media, can increase appeal and facilitate delivery of moral and educational messages. This is also supported by Astuti et al., (2024), which asserted that use of pop-up book media assists development of children with intellectual disabilities through visual and

interactive approaches that stimulate multisensory abilities.

The increase in knowledge after using pop-up book media demonstrates that appropriate media can simplify understanding and stimulate the senses of children with intellectual disabilities. This aligns with the S-O-R theory, where the stimulus (pop-up book) can trigger a positive response from the children by delivering engaging messages. These results concur with Daniati et al., (2022), which stated that delivering information to children with intellectual disabilities requires supportive media for easier message reception. Based on Lutfi & Munizu (2023), pop-up book media can also increase enthusiasm and activity in learning. Supported by Yanta & Jon (2020), changes in knowledge before and after using pop-up book media indicate the effectiveness of this medium in improving comprehension among children with intellectual disabilities. The researchers believe that the use of supportive media such as pop-up books can foster enthusiasm and is effective for children with special needs, particularly those with intellectual disabilities.

CONCLUSION

This study shows that the knowledge of children with intellectual disabilities at SLB B-C Optimal Surabaya and SLB AKW Kumara II Surabaya regarding dental and oral health was categorized as poor before being given pop-up book media. However, after counseling using the media, their level of knowledge improved to the good category. Thus, there is a significant difference in knowledge before and after the use of pop-up book media, indicating the effectiveness of this medium in increasing understanding about dental and oral hygiene among children with intellectual disabilities.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest in this manuscript.

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