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Original Research

Effectiveness of a Dental Pop-Up Book in Sign Language on the Oral Hygiene Levels of Deaf Students at Special School in Jember

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ABSTRACT

Background: Dental and oral hygiene is the most important issue in a child with special needs, one of which is deafness with poor hearing function. Such limitations affect knowledge, resulting in attitudes and actions in keeping their teeth and mouth clean. Education through dental and oral health uses a printing medium that uses the visual aids of the deaf. A dental pop-up sign-language book taps into a three-dimensional visual display and a mix of sign language as a medium. This study aims to determine and examine the effectiveness of a sign-language dental pop-up book on dental and oral hygiene in SDLB 1 Patrang (special school) and SDLB B Bintoro (special school). **Methods:** This was a type of experimental research with a pre-experimental approach. The method used was a one-group pretest-posttest with a one-week intervention. Research subjects included 25 special school students from 1 Patrang and special school B Bintoro. **Results:** After administering ANOVA analysis, there was a difference. The intervention given using the dental pop-up book showed a different effect. According to analysis from Bonferroni, the use of dental pop-up books is effective for deaf children in the extremely severe category. **Conclusion:** Dental pop-up sign-language books are effective in increasing dental and oral hygiene in special school 1 Patrang and B Bintoro.

Keywords: Deafness; oral hygiene; dental pop-up book; health education; dental

1. INTRODUCTION

Children with special needs are children with physical and mental obstacles that interfere with their normal growth and development.(1) The number of children with special needs in Indonesia is 3.3% of the total children aged 5–17 years.(2) Data according to Susenas (2003), 679,048 school-age children have special needs, or around 21.42% of the total number of children with special needs in Indonesia.(3) According to WHO data in 2014, around 360 million people worldwide had hearing loss, namely 328 million adults and 32 million children. The habit of brushing teeth twice a day in children with special needs is approximately 70%, and 50–75% do it themselves without the help of others.(3)

Murni Winarsih, in Ririn Fidiawati, states that a deaf person is someone who experiences a deficiency or loss of the ability to hear, either partially or completely, which is caused by the malfunction of some or all of their hearing

devices, so that the child cannot use their hearing devices in everyday life.[1] Deaf children experience verbal communication disorders, so they use sign language to communicate, which causes obstacles in getting along with normal people. They have an egocentric nature that exceeds that of normal people, and they are quick to anger and easily offended.[4] According to Moores, in Mohammad Efendi, the factors causing deafness are deafness before birth (prenatal), deafness at birth (neonatal), and deafness after birth (postnatal).[5] According to Fiske et al., the following classification of deafness is based on the lowest sound that can be heard by deaf sufferers, which is measured in decibel units, namely mild hearing impairment, moderate hearing impairment, severe hearing impairment, and very severe hearing impairment.[6]

Most dental and oral hygiene conditions of deaf children show the moderate category.[7] The implication of oral hygiene for deaf children is that they cannot listen to instructions; therefore, operators need to know how they communicate.[6] Maintaining the cleanliness of the teeth and mouth of deaf children can be instilled from the start by increasing education about dental and oral hygiene.[8] Education through visual instructions is effective for oral health in deaf children.[9] Images and writing can be used as auxiliary tools.[10] The level of cleanliness of the teeth and mouth can be seen from the condition of the oral cavity, which is clean or has little debris and calculus. An indicator that can be used to see the cleanliness of a person's teeth and mouth is an index called the Oral Hygiene Index Simplified (OHI-S).[11]

Dental and oral health education activities aim to improve knowledge so that interest in healthy lifestyles by maintaining cleanliness and healthy teeth and mouth can be realized.[12] For deaf people, dental health education methods and media can be combined using sign language to make it easier to convey messages. The success rate for introducing sign language reaches 69%, so it is necessary to provide a wider introduction to sign language, with one example of a counseling method for deaf sufferers, namely music in the form of CDs (Corps Diplomatique) and "pop-up" books, which support optimizing their residual motor hearing at the sound detection stage.[13,14] Visual methods are needed to support the successful learning and understanding of deaf children because they have high visual perceptive abilities.[4]

Pop-up books are an interesting form of paper art that form a three-dimensional structure when opened and a two-dimensional structure when closed.[15,16] There are three main points in favor of a pop-up book: first, a pop-up book is practical to use and easy to carry; second, a pop-up book is different from books in general because it has dimensions when the book is opened, which adds enthusiasm; third, it invites interactivity in its use and can be used independently or in groups in learning activities that will be more fun.[17] The dimensional visual appearance makes the story more real, coupled with the surprises on each page. Images can suddenly appear from behind the page; in this way, the impression you want to convey can be better conveyed.[18]

Sign language prioritizes manual communication, body language, and lip movements, rather than sounds, for communication. Deaf children use this language by combining hand shapes, orientation, movements of the hands, arms, and body, and facial expressions to express their thoughts.[19] There are two sign languages in Indonesia: the Indonesian Sign Language System (SIBI) and Indonesian Sign Language (Bisindo). SIBI was developed by hearing people who represent Indonesians manually to teach signs according to Enhanced Spelling (EYD). Meanwhile, Bisindo is an original sign language created by deaf people themselves. Bisindo was developed based on the culture and character of Indonesian deaf communication.[20] SLB B schools (Special for the deaf) mostly use SIBI based on the SIBI dictionary.[21]

This research will examine in more depth and determine the effectiveness of dental pop-up books on the level of dental and oral hygiene of deaf children. This research can be used as a way to improve the cleanliness of the teeth and mouths of deaf children and can increase their health status.

2. METHODS

The type of research used is experimental with a pre-experimental approach. The research method used is the One-Group Pretest-Posttest. The study was conducted at Special School 1 Patrang, Special School B Bintoro Jember, from September to October 2019. The sampling method used was total sampling, and the research subjects were 25 students. In this study, there were several inclusion criteria, namely being registered as a student at Special School 1 Patrang and Special School Bintoro, with the first molars, upper right central incisors, and permanent left central incisors completely

erupted. The measuring instrument used in this research is an assessment sheet using the OHI-S index.

2.1 Experiment

The research subjects underwent an OHI-S examination to illustrate the initial condition before providing counseling with a dental pop-up book. Counseling using the dental pop-up book was assisted by a teacher for delivery using sign language and a demonstration of brushing teeth using a phantom by researchers, followed by brushing teeth together. The intervention time was 1 week, then an OHI-S examination was carried out to see the final picture after being given counseling.

2.2 Data Analysis

The research data were analyzed using SPSS and tested for normality with the Kolmogorov-Smirnov test, then a homogeneity test was carried out using Levene's test. The research results were normally distributed and homogeneous, followed by hypothesis testing using ANOVA with further analysis using the Post-Hoc Bonferroni test.

2.3 Ethical Clearance

The research has received approval from the Heart Research Ethics Committee, Faculty of Dentistry, Jember University, No. 543/UN25.8/KEPK/DL/2019.

3. RESULTS

Based on research that has been conducted, the distribution of research subjects based on the type of hearing impairment is dominated by the very severe category (40%), the severe category (24%), the moderate category (36%). Before the counseling was given, the OHI-s level was found to be in the good category (16%), moderate category (72%) and poor category (12%). After being advised on how to use it dental pop-up book, the OHI-s level is in the good category (48%), the medium category (52%), and there are no students in the bad category, which can be seen in Figure 1.

Based on the type of hearing impairment before counseling, a mean and standard deviation score obtained. The highest was 3.99 ± 0 for the kind of severe hearing impairment with the poor OHI-s category, it can be seen in Table 1.

Normality test results Kolmogorov-Smirnov show the data is normally distributed with values p=0.200 (p>0,05) before counseling and p=0.164 (p>0.05) after counseling use dental pop-up book. Test Levene obtained homogeneous distribution of data with values p=0.921 (p>0.05) before counseling and p=0.614 (p>0.05) after counseling using dental pop- up book. ANOVA analysis showed no differences before counseling was carried out with values p=0.098 (p>0.05) and there was a difference

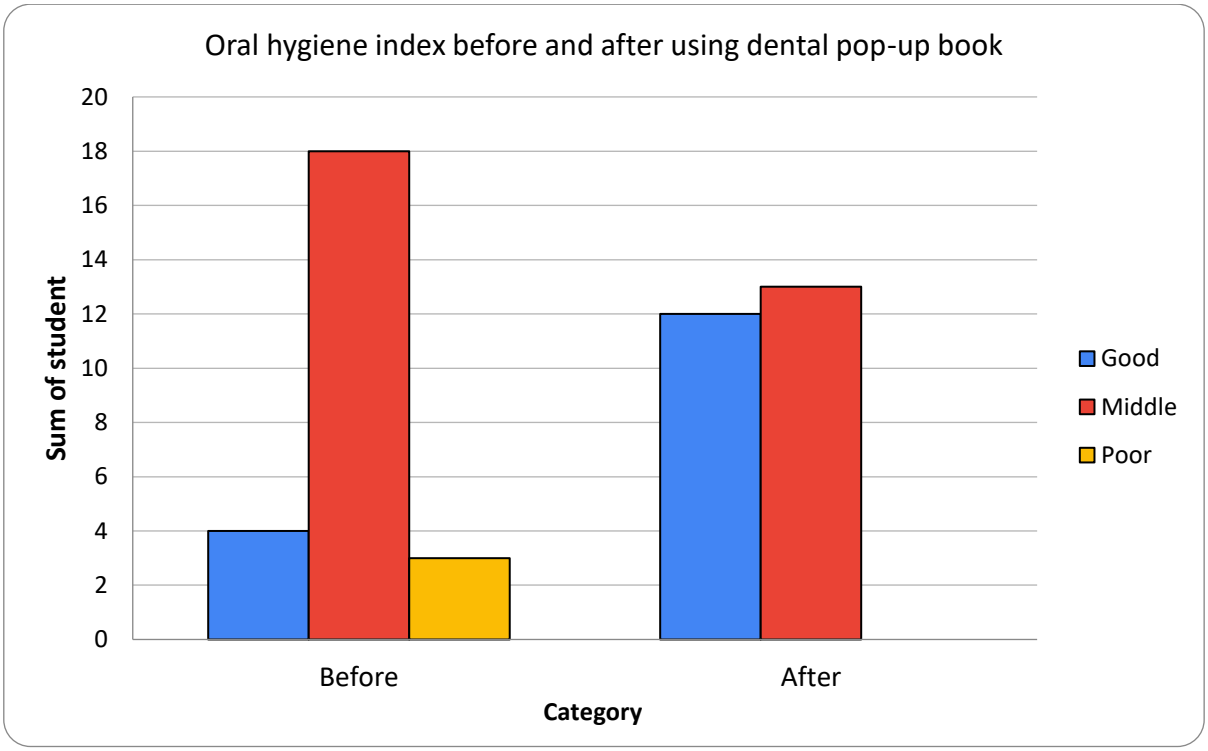

Figure 1. Percentage of research subjects based on the level of dental and oral hygiene before and after using dental pop-up book

Table 1. Distribution of research subjects based on the level of oral hygiene before and after using the educational dental pop-up book based on the type of hearing impairment

Level of Deafness	Good		Middle		Poor	
	Before Mean±SD	After Mean±SD	Before Mean±SD	After Mean±SD	Before Mean±SD	After Mean±SD
Low	0	0	0	0	0	0
Mild	0.82±0	0.82±0.23	2.27±0.44	2.11±0.30	3.83±0.24	0
Moderate	0	1.05±0.92	1.73±0.41	1.66±0.33	3.99±0	0
High	0.44±0.41	0.82±0.43	1.94±0.48	1.66±0.43	0	0

after being given training on using it dental pop-up book with value p=0.032 (p<0.05), conclusions can be drawn after being given counseling on using it dental pop-up book there are differences.

Continue testing with Post-Hoc Bonferroni There is a significant difference between the level of dental and oral hygiene before and after using an educational dental pop-up book in the moderate-very severe category of hearing impairment with value p=0.030 (p<0.05). This indicates significant differences are marked with the symbol.

4. DISCUSSION

Data collection was obtained by carrying out dental and oral hygiene checks before and after providing education using dental pop-up book using the OHI-s index. This method is used to show the status of dental and oral hygiene in groups and is easy to use quickly.[22] Descriptive results showed that the average frequency of OHI-s scores for deaf people was in the medium category, similar to Agusta's opinion that the dental and oral hygiene conditions of deaf children mostly showed the medium category.[7]

This condition can be caused by a lack of information obtained, resulting in wrong behavior and affecting oral hygiene, or the information received is clear enough but not precise in its application. These results also align with the opinion that children with special needs have poorer oral and dental health compared to normal children due to the difficulty they experience in cleaning their teeth and mouth and also due to low motor and cognitive abilities.[23] This is reinforced by Purohit's opinion which states that there are limitations for the deaf influential to the knowledge and actions of keeping teeth and mouth clean.[24] More limitations for the deaf, the oral and dental hygiene level will also worsen. Barriers in language, vocabulary, irregular speech and language result in hampered intelligence development because potential abilities are low and do not develop optimally.

The effectiveness dental pop-up book towards the type of deafness before counseling is carried out, namely the greater the kind of deafness, the worse the OHI-s, but after the counseling is carried out using dental pop-up book obtained better OHI-s. The research subjects interest can influence changes in OHI-s scores in paying good attention during counseling and applying it correctly during demonstrations. Each individual's high motivation for dental and oral hygiene also has an influence.

Improving dental and oral health in children with special needs, through promotive and preventive activities to educate children with special needs about the importance of maintaining healthy teeth and mouth. These results are clarified by the opinion of Sandeep and Madhuri et al., an effective way to maintain good oral hygiene in deaf children is by providing visual instructions.[9] Dental pop-up book which combines writing, images and moving animation, in line with what was stated by Koch and Poulsen, images and writing can be used as auxiliary tools. Education given to the deaf requires visual media because it is considered more effective in educating them about dental and oral health.[10]

The illustrations in this sign language-based dental pop-up book display pictures and sign language that easily help deaf children. Each page has continuous story content with several interesting things that can make an impression on the reader. Asriani stated that pop-up books can help deaf people optimize their remaining motor hearing.[14] Deaf children can be categorized as a group at high risk because they are susceptible to caries and periodontal disease compared to children who are

not deaf.[25] Teaching through sight and hearing that is not entirely dependent on understanding words or However, deaf children can use the same symbols with the remaining hearing function and motor movements.[26]

Changes in individual OHI-s scores between before and after counseling using a dental pop-up book could be caused by research subjects' interest in paying good attention during the counseling and applying it during demonstrations after being given the counseling, in addition it could also be from the motivation of individuals who care about dental and oral hygiene.

Hopefully this research will continue to make it more specific and significant to providing extension interventions based on time and repetition in education. Improvements to dental pop up products are also needed to improve existing deficiencies and add other features to add visualization and special interest to deaf children so that an understanding of dental and oral hygiene in children with special needs can be achieved.

5. CONCLUSION

Based on the results of research that has been carried out, it can be concluded that extension uses a dental pop-up book based on sign language, which is effective in improving the oral hygiene of deaf people in the very severe category at special school 1 Patrang and special school B Bintoro, Jember Regency. Further research needs to be carried out by providing interventions at different times and repeated counseling is required so that the results obtained are more effective.

Ethical Approval

The research has received approval from the Heart Research Ethics Committee, Faculty of Dentistry, Jember University, No. 543/UN25.8/KEPK/DL/2019.

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Competing Interests

All the authors declare that there are no conflicts of interest.

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Underlying Data

Derived data supporting the findings of this study are available from the corresponding author on request.

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