

Braille Smart Book with Audio Connection QR Code to Improve the Teeth-Brushing Skills of Blind Children

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Abstract:-

➤ Background:

Since one of the things that prevents blind people from learning about dental and oral health is poor eyesight, the dental and oral health of blind children is typically worse than that of persons with normal vision. The average score is 35% of children who can brush their teeth properly and correctly. Blind children have difficulty interpreting what they should do. To overcome this, the media "Braille Smart Book With Audio Connection QR Code" was created to improve the teeth brushing skills of blind children. Research Objective: To produce "Braille Smart Book With Audio Connection QR Code" media that is effective and feasible to implement to improve the teeth brushing skills of blind children. Method: Using the Research and Development (R&D) method with a pre-experiment research design (One Group pre-test and post-test design). With a sample size of 20 blind children, they were given intervention with "Braille Smart Book With Audio Connection QR Code" for 10 days. Results: The media expert validated the "Braille Smart Book With Audio Connection QR Code" using the interclass correlation coefficient test and obtained a value of 0.935. "Braille Smart Book With Audio Connection QR Code" has been proven effective in improving the teeth brushing skills of blind children. Conclusion: The media "Braille Smart Book With Audio Connection QR Code" is effective in improving the teeth brushing skills of blind children.

Keywords:- "Braille Smart Book with Audio Connection QR Code", Blind Children, Teeth Brushing Skills.

I. INTRODUCTION

In order to attain optimal health, the government of Indonesia is still working to improve the country's healthcare system. In 2018, the World Health Organization (WHO) stated that dental health is a significant predictor of general well-being, happiness, and health. When the oral cavity—which includes the teeth and tissues that support them—is free from discomfort and diseases including periodontal disease, cancer of the mouth and throat, mouth wound infections, tooth decay, tooth loss, and other disorders that impair a person's ability, it is referred to as being in oral health. when speaking, grinning, biting, and chewing. Thus,

oral health is an important component of a person's general health, happiness, and quality of life.

The results of Basic Health Research (Riskesdas) in 2018 stated that the proportion of dental and oral health problems was 57.6% and those receiving services from medical personnel in the dental health sector was 10.2%. The largest proportion of dental problems in Indonesia are damaged teeth, cavities, and pain (45.3%). Meanwhile, the oral health problem experienced by the majority of the Indonesian population is swollen gums (abscesses) at 14%. The proportion of tooth brushing behavior correctly way is 2.8% [1].

According to estimations from the WHO, 7–10% of Indonesia's entire kid population is estimated to have special needs. According to the latest data, the number of children with special needs in Indonesia has reached 1,544,184 children, with 330,764 children (21.42%) in the age range 5-18 years and only 85,737 children with special needs attending school². "Blindness" is a form of physical disability that affects a person's visual abilities, where the individual cannot see their surroundings. Data from the Indonesian Ministry of Health shows that the number of blind people in Indonesia reaches 1.5% of the total Indonesian population. If currently, the population in Indonesia reaches more than 270 million people, then the number of people with visual impairments is around 4 million people [3].

Limited vision is a challenge in maintaining oral hygiene for blind people. When it comes to dental and oral health issues, people with visual impairment are more vulnerable than people with normal eyesight. One of the things preventing blind individuals from learning about dental and oral health is this restriction, which will eventually affect their attitudes and behaviors around maintaining dental and oral hygiene [4].

As many as 41.9% of blind children have high information of dental and oral health, while 58.1% have poor knowledge. The dental and oral health of blind children is generally worse than that of people with normal vision. The aforementioned data's results demonstrate that there is a substantial correlation between blind children's oral health and dental and oral health knowledge, but their oral and dental health still falls short of being in the good range. In order to improve the dental and oral health of blind children, a unique

strategy that considers their acceptance as well as proper treatment and preventive measures is required [4].

Approximately 1% of the population in that age bracket, or up to 19 million children under the age of 15, are visually impaired. This makes it difficult for parents and kids who are visually impaired to develop different facets of life, such as independence and health. Blind children need to receive different treatment from normal children. The care provided can make a positive difference in enabling blind children to reach their full potential on par with non-blind children [5].

Normal people have little difficulty receiving dental and oral care; however, children with special needs face different challenges because of physical, mental-intellectual, social, or emotional limitations that have a major impact on their development relative to other children of the same age. Tooth brushing becomes a challenge. Children who are blind are one category of special needs kids that need extra care. Blind children's oral cavities are in poor condition due to a variety of problems, including inadequate help, motor skills, tooth brushing technique, and lack of supervision. In addition, inadequate vision can make it difficult to comprehend and become proficient in dentistry and oral hygiene practice methods [6].

Blind children usually read and write using a tool called Braille, where braille is a code board that has 6 dots, and the six dots can be combined so that they can be read using the fingertips [7]. Blind children show the ability to understand braille letters, using braille flashcard media can make students show development in understanding the concept of braille letters. Students can identify the raised dots of the alphabet letters in braille [8].

Children who are blind have sensitive hearing. For this reason, it's crucial to take into account their hearing sensitivity when educating them about dental health. One effective method, in this case, is to use the Audio method with the help of "QR Code", voice learning, and visual structure cell phones (which they can use through touch) at the point they are prepared or adjusted to be a voice guide. QR Code has the advantage of being attractive and suitable for use as an innovative learning medium in this era of technological development because students can adapt to technology directly. This combination is an approach to changing learning assistance [9]. Selecting instructional materials that meet the requirements and circumstances of visually impaired students is crucial for effective teaching. Dental professionals need to be very patient and persistent while teaching blind persons about oral care. Aside from that, giving blind people adequate time and using appropriate and supporting media are critical components of the teaching process. Compared to typical youngsters, blind persons typically have superior senses of touch and hearing. Combining these two senses will result in increased efficacy [10].

Based on the results of a preliminary study using the "Smart Card With Audio Connection" media among Jepara State Special School students on October 4, 2023, it was seen that there was a change in tooth brushing behavior, blind children were more enthusiastic about participating in the practice of brushing their teeth because the "Smart Card With Audio Connection" media was more interesting just by scanning the Qr Code using a smartphone/cellphone then you can make a sound about the steps for brushing your teeth, but there are drawbacks because there are some students who don't have smartphones/cellphones so I have the initiative to combine braille writing and Qr Code so it is hoped that it will be used more effectively by blind children, they can not only hear but also read braille. From the results of a preliminary study of dental and oral health examinations at the Jepara State Special School, it was found that 6 blind students had an average debris index of 2.0 in the poor category, an average calculus index of 1.1 in the moderate category, and an average OHIS of 1.45 in the medium category. Meanwhile, only 35% can brush their teeth properly and correctly. These data show that efforts are needed to improve the dental and oral hygiene status of blind children.

To improve the skills of blind children in brushing their teeth to maintain oral and dental hygiene, efforts are needed to increase their knowledge, and lifestyle and develop effective teeth brushing skills. In this context, a modification has been developed called "Braille Smart Book With Audio Connection QR Code" which is in the form of a pocketbook containing braille writing and a QR Code that can produce sound to provide appropriate instructions regarding tooth brushing techniques to blind children, because of the child's sensitivity. Blindness is found in touch and sensitivity to sound. From the description above, this research aims to test the effectiveness of brushing teeth with the help of the "Braille Smart Book With Audio Connection QR Code", by carrying out an intervention using this media, it is hoped that it will be effective in improving teeth brushing skills in blind children. It is hoped that this media can increase interest, concentration, understanding, and awareness, and help blind children change their intentions regarding brushing their teeth. This then produces positive changes in tooth brushing habits, thereby improving skills in brushing teeth which will ultimately have an impact on changing dental health status and improving the status of their dental hygiene.

II. RESEARCH METHODS AND SAMPLES

The method used in this research was Research and Development (R&D) with a sample of 20 blind children with an average age of 7-18 years and Phase 1 feasibility trials on blind children and teachers (users).

III. RESULTS

➤ *Test the Effectiveness of the "Braille Smart Book with Audio Connection QR Code" Media on Teeth Brushing Skills*

Table 1 Effectiveness Test on Teeth Brushing Skills

Variable	Mean elementary school pretest	Mean elementary school post-test	p-Value
Teeth brushing skills	70.30	82.50	0,000

Based on the table, shows that the results of the effectiveness test of paired data on students' teeth brushing skills have a p-value of 0.000 ($p < 0.05$), meaning that the "Braille Smart Book With Audio Connection QR Code" model is effective in improving teeth brushing skills in blind children. There was an increase in the skills of blind children before and after being given treatment, where before treatment the average value of teeth brushing skills for blind children was 70.30% (Medium) increased to 82.50% (Good).

➤ *Test the Feasibility of 2 uses of the "Braille Smart Book with Audio Connection QR Code" model by users*

Table 2 Feasibility Test by End User

Subject	N	F (%)	Average	Average measures	p-Value
Teacher 1	11	96	93%	0.78	0.009
Teacher 2	11	85			
Teacher 3	11	98			
Teacher 4	11	94			

Based on the table showing the results of the assessment of 4 blind teachers, the average suitability score was (93%) in the very suitable category. The results of the feasibility test show that the p-value = 0.009, which means that the media is declared suitable for independent use by blind teachers as end users. This is to the results of observations carried out objectively on the application of the "Braille Smart Book With Audio Connection QR Code" media. Based on the results of the average measures from the Interclass Correlation Coefficient test, the result was (0.78) in the good reliability category.

IV. DISCUSSION

➤ *Media "Braille Smart Book with Audio Connection QR Code"*

The result of collecting information regarding dental health learning media that is suitable for blind children is that relying on their sense of sensitivity, namely the sense of touch that blind people have, must be prioritized in selecting appropriate educational media. With their sensitive sense of touch, they can easily understand Braille. Apart from the sense of touch, blind people also have good sensitivity to their sense of hearing, so the sensitivity to the sense of hearing of blind people needs to be utilized in providing education [11].

These two senses must be prioritized in providing education, especially promoting dental health, the media "Braille Smart Book With Audio Connection QR Code" is a combination of braille writing and a QR code that can produce sound that can be accessed using a smartphone/cellphone, in this modern era. as now there are many applications that can be used by blind children to learn, so it is hoped that this media can help blind children understand material about the meaning of brushing their teeth, the steps for brushing their teeth, and how to maintain oral and dental hygiene [12].

From the results of the information collection, it can be concluded that the dental health program for blind children at the Jepara State Special School is still inadequate. Dental examinations are carried out only once a year. If there is a problem with the dental health of a blind child, dental health workers from the Community Health Center notify the parents and advise the parents to take their child to the Community Health Center, clinic, and hospital for action or treatment [13]. Routine examinations are needed to detect or prevent problems in the teeth of blind children, but there are several obstacles, namely dental health workers at the Community Health Center are still limited and the infrastructure at the Community Health Center is still incomplete, therefore promotive and preventive efforts are needed to Preventing dental problems in blind children by providing dental health education involving blind teachers at SLB.

Dental health education for blind children is carried out by the school by including material about how to brush teeth properly and correctly in self-development learning so that blind children can care for themselves [14].

➤ *The Effectiveness of the media "Braille Smart Book with Audio Connection QR Code" in Improving the Teeth Brushing Skills of Blind Children*

The results of the paired data effectiveness test show that the p-value is 0.000 ($p < 0.05$), meaning that the media "Braille Smart Book With Audio Connection QR Code" is effective in improving the teeth brushing skills of blind children. The teeth brushing skills of blind children have improved after being given the media intervention "Braille Smart Book With Audio Connection QR Code". The implementation of the media "Braille Smart Book With Audio Connection QR Code" is carried out by the teacher every day before learning begins \pm for 10 minutes, then to monitor blind children whether they are brushing their teeth

at home in a pocketbook complete with a tooth brushing checklist sheet that is filled in by parents by checking if done. Teddi's behavior change theory states that it takes 10 days to change a person's habits, so in this study, intervention was carried out every day to make changes in brushing teeth in blind children.

➤ *Feasibility of the Media "Braille Smart Book with Audio Connection QR Code" for Independent Use by Teachers*

After the teacher carries out dental health education using the media "Braille Smart Book With Audio Connection QR Code" within 10 days, then a feasibility test of the model is carried out to be used independently by blind teachers and users. The assessment is seen from the suitability of the media so that it is suitable for use by blind children. The results of the feasibility test used independently by blind teachers showed an average feasibility of 93% with a very suitable category. The results of the feasibility test show p-value = 0.009, which means that the media is declared suitable for use independently by blind teachers as users. Based on the results of the average measures from the interclass correlation test, a result of 0.78 was obtained in the good reliability category.

Teachers have an important role in the learning process, as stated in Law Number 14 of 2005 concerning Teachers. Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in the learning process. Teachers as educators and teachers are likened to second parents who teach various skills including tooth brushing skills to prevent tooth decay. to students. Teachers are given prior education about dental health, such as the meaning of brushing teeth, how to brush teeth, and how to maintain oral and dental hygiene as well as how to use the media "Braille Smart Book With Audio Connection QR Code" so that teachers can implement the media independently. Teachers in implementing learning should have sufficient knowledge so that the learning provided can run well.

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