Feasibility Test of the "BAHUTE" Model: Technique for Cleaning Teeth in Deaf Children

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Abstract

A child who is deaf is someone who has lost their ability to hear due to the malfunction of some or all of their hearing devices, so that they will experience obstacles in their language development and have lower dental hygiene conditions than children who are not deaf. The term "bacterial hunting team" in BAHUTE plays an important role because the presence of bacteria in the process of caries is very influential, namely that it can ferment food residue attached to the tooth surface so that it becomes acidic, which makes caries easier to develop.

This study was designed to develop and analyze the intervention model "BAHUTE" (bacterial hunting team), a teeth cleaning technique for deaf children in their daily activities in the form of visual video media. Research Methods: Research and Development with the Development of the ADDIE Model, namely Analysis, Design, Development, Implementation, and Evaluation.

The results of the expert validation test on the feasibility of the Bahute model development media included 96% of dental health material expert examiners, 94% of health promotion media experts, and 95% of children with special needs experts with an average of 91.5 and a p-value of 0.81, which means that the Bahute model is very suitable to be used as a technique for cleaning the teeth of deaf children and is reliable and close to perfect. The results of the limited group trial obtained an average of 87.5% (feasible category).

The Bahute Model is suitable for use as a teeth cleaning technique for deaf children.

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Introduction

Oral health is an integral part of general health, and dental caries is a worldwide public health problem that affects the level of school attendance. Children with hearing impairment (deaf) have a higher risk of dental caries and periodontal disease than those who are not deaf.[1–3] Hearing and speech impairments are the most significant barriers to education for deaf people. Children's dental caries show a high percentage of around 60–90%, generally occurring in children aged 6–12 years because they like to consume cariogenic foods and drinks.[1,3] The majority of teeth are damaged (cavities or pain), followed by swollen gums and abscesses (14%), daily tooth brushing behavior older than 3 years (94.7%), and correct tooth brushing behavior only 2.8%.[4–6]

Deaf people are individuals who have had damage to their sense of hearing so that they cannot perceive sound stimuli or other stimuli. According to data on more than 5% of the world's population, around 466 million people have hearing loss, consisting of 432 million adults and 34 million children.[7,8] Parents of deaf children face obstacles in implementing how to keep their sons' and daughters' teeth clean, especially in teaching them to brush their teeth. A dental hygiene program must be imposed to improve brushing skills in children of this group. Tooth brushing is a method of dental and oral hygiene to prevent dental caries. In the general population, regular tooth brushing with fluoride toothpaste can prevent dental caries and periodontal disease, but its benefits are unclear in children with special needs.[9,10] Tooth brushing techniques include horizontal brushing, Stillman roll or modification, vibratory (charter, Stillman

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Mc call, bass), phone, bass, and scrub. The scrub technique is a simple method that only requires a short time and is easy to apply to children, including those with special needs. The prevalence of caries in deaf children is 74.67%, according to the findings of a study by Qureshi.[11–13]

This research presents a new approach to the "BAHUTE," or Bacterial Hunting Team model to help parents of deaf children and health practitioners clean the teeth and mouths of deaf children. Because deaf people have hearing limitations, efforts are made to maximize their sense of sight in reading and seeing. Behavior is a person's reaction to external stimuli,9 which is then implemented with the ability to do something interesting and stimulate movement. Researchers will try to develop the "BAHUTE" as a model for cleaning teeth and mouths, that is adapted to the characteristics of deaf children.

Materials and methods

This research consists of both research and development. The purpose of this study is to develop and test the feasibility of the BAHUTE Model as a dental and oral hygiene technique for deaf children. The development model uses the ADDIE method, consisting of analysis, design, development, implementation, and evaluation.

The first stage, namely analysis, includes; Analysis of the problem of how to maintain the oral and dental health of deaf children, Analysis of the oral hygiene state in deaf children, Analysis of dental and oral cleaning materials for deaf children, psychological analysis of deaf children. The second stage is design, which is carried out in the form of making flowcharts and making storyboards. The third stage is developing BAHUTE model creation. The fourth stage of the implementation stage is, media experts, material experts, and deaf children experts Validation. The fifth stage is the feasibility test of the BAHUTE model for users, consisting of 10 parents and 5 teachers of deaf children at Tamansari Special School. Data analysis in expert validation using the interclass correlation coefficient test.

Result

Analysis of problems and expectations in the maintenance of oral and dental health for deaf children, based on the findings of focus groups with parents, 70% of deaf children are still unable to brush their teeth independently and must be accompanied by their parents. There are still many parents (60%) who answered that they had not found a way to make their children independent and make it easier to brush their teeth. Parents are hoping that there are models and media specifically designed for deaf children in cleaning their teeth. The results of interviews with teachers of deaf children concluded that there was no tooth brushing program taught for deaf children at school. In fact, they do not need a special approach. The instruction for them can be delivered clearly using both writing and sign language. Communication must be face-to-face in order to avoid offending them. The teacher's hope is that there is a model for cleaning teeth for deaf children and using animated videos as media.

Oral hygiene analysis of deaf children, examination using the Patient Hygiene Performance Index (PHP). The results of the OH examination in deaf children are as follows:

Hygiene Performance Indeks (PHP)	N	%
Good	1	10
Moderate	3	30
Less	6	60
Total	10	100

Table 1. Frequency distribution of oral hygiene examinations of deaf children.

The table above shows that more than half of the sample of deaf children (56%) still have poor oral hygiene. This shows that deaf children still need models for cleaning teeth that can be applied in everyday life so that they can improve oral hygiene.

Analysis of the Psychological Conditions of Deaf Children, the results of the focus group discussion with experts on children with special needs conclude that deaf children often feel cautious and prejudiced, which occurs due to abnormalities in their hearing function. They cannot understand what other people are talking about, so they become cautious easily. Deaf children have normal intelligence, so it is easy to give them an education. However, it must be in accordance with their physical condition, so the media utilized can be videos or hands-on practice with clear writing and translators. Video media can be made as attractive as possible.

Material Analysis on How to Clean the Teeth of Deaf Children Materials needed to clean the teeth of deaf children include: A mixed technique to brush their teeth properly; The use of disclosing tablets for plaque staining; The use of a mirror when brushing teeth; The use of a tongue brush; Mouthwash; Dental Calendar.
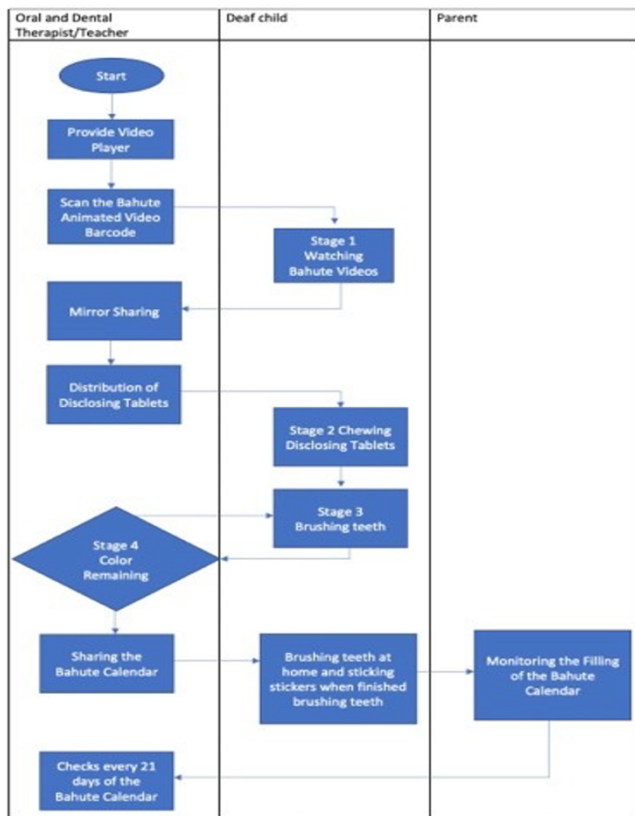

Figure 1. Flowcharts Bahute model.

Development at this point in the study, the researchers created the Bahute model (Bacterial Hunting Team) for cleaning teeth and mouth. The Bahute is a model that consists of several stages of teeth and mouth cleaning, which include:

1. Education through the media

The Bahute video can be accessed via the following QR code:

Figure 2. QR Code Video Bahute.

2. Chewing and disclosing tablets
Disclosing tablets can help deaf children distinguish the presence or absence of plaque, making it easier to clean their teeth.
3. Mirror Use
Mirrors can help show the presence of plaque with the help of disclosing tablets, and deaf children can clearly see what needs to be cleaned.
4. Using Modification Techniques to Brush Your Teeth.
The tooth brushing technique used is a modified technique consisting of the buccal and lingual using Fone's technique, the occlusal and incisal using the scrub brush technique, and the palatal and lingual using the Stillman roll technique.
5. Cleaning the Tongue
For one cleaning, the tongue is cleaned with a toothbrush bristle.
6. Gargling with mouthwash
This fresh-smelling liquid acts to clean food residue that cannot be reached by a toothbrush, both between the teeth and in the corners of the oral cavity.
7. Dental Calendar
A dental calendar is used to monitor brushing at home.

Model validation the initial product of the Bahute model is a hard file of model stages and an MP4 video of Bahute that has been uploaded on YouTube, showing the results of dental cleaning technique for deaf children, which has then been validated by material experts on dental health or lecturers who are also pediatric dentists, with sub-specialist of children with special needs consultant named Prof. Dr. Williyanti Drg., Sp.KGA., Sub. Sp. AIKB (K), a media expert from Health promotion lecturer, Febri Sri Lestari, S.Sos., M.K.M, and an expert on children with special needs, the Head of Special school, Rahmat Syafi'I, M. Pd.The following is a result summary of expert validation:

No	Expert	Assessment	Score(%)	Average(%)	Category	p-value*
1	Dental Health Material Expert	1	89			
		2	96			
2	Media Expert	1	86	91.5	very eligible	0.81
		2	94			
3	Special Needs Children Expert	1	92			
		2	95			

Table 2. Expert Validation Results.
*Interclass correlation coefficient.

Based on the average results of the 1st and 2nd validations, the Bahute model is declared "very eligible,"; hence, it could be tested on respondents. The results of the interclass correlation coefficient test is a P-value of 0.81, which means that the reliability and validity of the Bahute model are greater than 0.71, which is close to perfect.

Based on the results of expert validation, the Bahute model was then tested on 15 users consisting of teachers and parents of deaf children at Tamansari SLBN. The following user trial results can be seen in the table below:

Feasibility	N	%	Average	Category
Not feasible	0	0		
Les feasible	0	0		
Feasible	8	53.3	87.5	Feasible
Very feasible	9	46.7		
Total	15	100		

Table 3. User Feasibility Test Results Category

The data of trials to users in the table indicates that the model is feasible, with an overall average score of 87.5.

Discussion

The term "bacterial hunting team" in BAHUTE plays an important role because the presence of bacteria in the process of caries is very influential since they can ferment food residue attached on teeth surface and make it acidic, which makes caries easier to develop. Bahute is a model that contains several stages of cleaning teeth and mouth, which include educating through Bahute video, chewing disclosing tablets, using mirrors, brushing teeth, cleaning the tongue, gargling with mouthwash, and dental calendars. The Bahute video is an educational video showing poor oral hygiene caused by consuming foods that contain lots of sugar and are sticky, followed by an introduction to materials and tools for cleaning teeth, including mirrors, disclosing tablets, toothbrushes, toothpaste, and mouthwash. It also shows how to chew disclosing tablets, the presence of plaque on the teeth, and how to brush your teeth properly and correctly. This video is supplemented with text and sign language adapted to the characteristics of deaf children.

The summary of the FGD results from the previous in-depth interviews emphasizes the use of communicative pictures and writing for deaf children. Media supplemented with illustrations and writing are easier for deaf children to understand. The type of video is an educational one with a duration of 5-7 minutes. The emphasis is on the visuals and the information provided because the target audience of this video is children with hearing impairments. The educational media in this research include sign language elements as additional assistance for deaf respondents in receiving the information provided.

Animated videos using sign language are effective as media of counseling on dental and oral health for deaf children who only rely on their sense of sight. A research reported that oral health education with sign language videos is effective in reducing gingival scores and plaque, as well as increasing knowledge and teeth-cleaning skills among the deaf population. Previous research resulted in a decrease in the mean plaque score, and there was a significant difference between the plaque index scores before and after counseling with video media in the deaf treatment group.[14,15]

The second method in the Bahute model is chewing disclosing tablets which can help deaf children distinguish the presence or absence of plaque, making it easier to clean their teeth. Deaf children have limited hearing, so they focus more on sight. With the color of the plaque, they will focus more on cleaning what they see. Disclosing can reduce plaque scores; this is supported by research showing that there is a significant decrease in the average plaque score and PHP score.[16]

The third stage is the use of a mirror. A mirror can help show plaque with the help of disclosing tablets, and deaf children can clearly see what needs to be cleaned. The results of Jeong et al.'s study concluded that there is a significant decrease in plaque scores between brushing teeth in front of a mirror and not.[17,18]

The tooth brushing technique used is a modified technique consisting of the buccal and lingual using Fone's technique, the occlusal and incisal using the scrub brush technique, and the palatal and lingual using the Stillman roll technique. The study concluded that there is a significant reduction in plaque after using the combined brushing techniques.[12,13] The fifth

stage, namely cleaning the tongue, is done using a toothbrush. The bristles are moved slowly once a day. Based on the results of research, it is concluded that the habit of cleaning the tongue regularly, at least once a day, is necessary and beneficial for preventing or treating halitosis. The sixth stage is gargling with mouthwash. This fresh-smelling liquid cleans food residue that is not reached by a toothbrush, both between the teeth and in the corners of the oral cavity. According to a study, both povidone-iodine and nanohydroxyapatite types of mouthwash had a considerable impact on lowering the number of bacteria in the oral cavity.[19–21]

The final stage is the use of dental calendar. It is used to monitor brushing at home. It consists of 21 days of morning and evening brushing schedules that must be marked with a tooth sticker every time you brush your teeth. This dental calendar is made as attractive as possible so that it makes children interested in brushing their teeth. This is in line with the results of a study, which showed that the use of a dental calendar can influence changes in children's tooth brushing behavior.[22,23]

The Bahute model developed is feasible to be applied directly to deaf children based on the results of expert validation by dental health material experts, media experts, and children with special needs experts, with an average category of "very feasible." The results of feasibility trials to users, which indicate average feasibility, confirm these findings. This is in the line with the results of study, that visual reinforcement and manual plaque control methods through tooth brushing are the simplest and most successful methods for children with special needs. Therefore, the Bahute model is an appropriate method for brushing deaf children's teeth.[24] Therefore, the Bahute model is an appropriate method for brushing deaf children's teeth. This model can be applied by dental health workers, teachers, and parents of deaf children at school and in home environments. Dental health students can use the model to provide dental cleaning assistance to deaf children.

Conclusions

The results of the expert validation test on the feasibility of Bahute model development media include material experts on dental health at 96%, health promotion media experts at 94%, and children with special needs experts at 95%, with an average of 91.5% and a p-value of 0.81. This means the Bahute model is very suitable to be used as a technique for cleaning the teeth of deaf children and is reliable and close to perfect. The results of the limited group feasibility trials obtained an average of 87.5% (feasible category). Overall, the Bahute Model media is a teeth-cleaning technique suitable for deaf children.

Declaration of Interest

The authors report no conflict of interest.

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