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**EFFECT OF 'BRUSH YOUR TEETH' SONG ON DENTAL AND ORAL HEALTH
 OF DOWN SYNDROME CHILDREN**

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ABSTRACT

Background: Down syndrome children are a group of children with special needs caused by abnormalities in chromosomes that result in loss of skills and brain function. Songs are innovative health promotion media, songs can help children with Down syndrome increase motivation, concentration, perceptual abilities, as well as retention and memory skills including oral health behavior. **Objective:** Knowing the effect of using the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" on improving the oral health behavior of children with Down syndrome. **Method:** Using quasi-experimental research design with one group pre and posttest method. **Results:** Mann Whitney test obtained a significance value of $0.000 < 0.05$, meaning that there is an effect of using the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" on improving the oral health behavior of children with Down syndrome. **Conclusion:** The song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" has an effect on improving the oral health behavior of children with Down syndrome.

Keywords: down syndrome, oral health behavior, songs

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INTRODUCTION

Down syndrome children are a group of children with special needs whose development is slower than that of other children. Down syndrome is an abnormality in the 21st chromosome.^{1,2} Down syndrome is caused by immune dysregulation and *disintegrative disorder* characterized by loss of skills and brain function.^{3,4} There are three categories of Down syndrome according to its level, namely mild, moderate, and severe.⁵ Mild-moderate Down syndrome has difficulty thinking, but is still able to follow academic activities within certain limits.⁵ On In 2018 there were 0.21% of children with Down syndrome in Indonesia.⁶ In the same year, children with Down syndrome reached 0.39% in the South Kalimantan region.⁷ Data from the *American Dental Association* (ADA) shows that 93.8% of children with Down syndrome have dental caries.⁸ Poor oral health conditions are a problem that is commonly found in children with Down syndrome, caused by the inability of children to brush their teeth independently due to impaired intellectual and adaptive functions.⁹ One solution to handling the problem is to socialize tooth brushing for children with Down syndrome.⁹ Intelligence below the average of normal children causes children with Down syndrome to have limitations in terms of receiving information.⁹

Blum's theory asserts that oral health is influenced by 4 main factors, namely environment, behavior, health services, and heredity.¹⁰ One of the efforts to improve effective oral health behavior is through health promotion activities.¹¹ Health promotion can be supported by its implementation through promotional media. According to Notoatmodjo, based on its use, promotional media can be divided into reading materials and demonstration materials, while based on the receipt of information by the human senses, promotional media can be divided into three, namely visual media, auditive media, and audiovisual media. One form of innovation that combines demonstration media and auditive media is songs.^{11,12}

Songs can create a pleasant atmosphere, stimulate thinking, improve concentration, and memory while affecting cognitive processes.¹³ Musical elements such as rhythm, beat, and harmony affect human physiology, especially brain waves and heart rate while also fostering enthusiasm and increasing focus.^{13,14} When listening to

music, especially music that contains lyrics such as songs, it is more effective for widespread and bilateral neural network activity than listening to verbal material without music.^{14,15} Music can help children with special needs such as *Down syndrome* to communicate, foster cooperative attitudes, acceptance, increased motivation and concentration, perceptual abilities, and retention and memory abilities.¹⁶

Based on this description, it is necessary to conduct research on the effect of using the innovation song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" on improving the oral health behavior of children with *Down syndrome*.

MATERIALS AND METHODS

This study is a quasi-experimental research design using the *one group pre and posttest* method. This design includes one group observed at the *pretest* stage which is then followed by intervention and *posttest* to determine the difference in oral health behavior in children with *Down syndrome* before and after being given the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth". This research has been approved by the Health Research Ethics Commission of FKG ULM with *Ethical Clearance* Letter No. 032/KEPKG-FKGULM/EC/X/2024.

The samples in this study were 32 children with mild-moderate *Down syndrome* in SLB-C Negeri Pembina South Kalimantan Province. The sampling technique was carried out using *total sampling*. This study lasted for one week, where on the first day a *pretest* was conducted, the second day to the sixth day was the administration of the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth", and on the last day a *posttest* was conducted.

RESULTS

Sampling was carried out by filling out a questionnaire by 32 mothers of children with *Down syndrome* to determine the oral health behavior of children before and after being given an intervention with the media song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth." The results of the questionnaire were then calculated and categorized with 3 categories, namely good, moderate, and bad. The *pretest* results before being given the intervention song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" can be seen in **table 1** below.

Table 1. Dental and oral health behaviors before the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth"

	<i>Pretest</i> (n)	Percentage (%)
Bad	7	22%
Medium	25	78%
Good	0	0%
Total	32	100%

Based on **table 1** *pretest* data above, it is known that there are 7 children (22%) at the level of poor oral health behavior and 25 children (78%) at the level of moderate oral health behavior. *Posttest* results after being given the intervention song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" can be seen in **table 2** below.

Table 2. Dental and oral health behavior after being given the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth"

	<i>Posttest</i> (n)	Percentage (%)
Bad	0	0%
Medium	4	12,5%
Good	28	87,5%
Total	32	100%

Based on **table 2** *posttest* data above, it is known that there are 4 children (12.5%) at the level of moderate oral health behavior and 28 children (87.5%) at the level of good oral health behavior. The results of the *Wilcoxon* test for *pretest* and *posttest* data can be seen in **table 3** below.

Table 3. Results of Pretest and Posttest Analysis Test with Wilcoxon

	Mean	Standard Deviation	Sig. (2- tailed)
Pretest	48.56	8.512	0.000
Posttest	67.22	4.477	

Based on **table 3** above, the sig. *pretest-posttest* value $p = 0.000 < 0.05$, which means that there is a significant difference in the value of oral health behavior of children with *Down syndrome* before and after being given the intervention song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth."

DISCUSSION

The results of the research that has been done show that there is an effect of using the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" on improving the oral health behavior of children with *Down syndrome*. The behavior of children with *Down syndrome* is not influenced by the gender and grade level of children with *Down syndrome*, but is influenced by the *Intelligence Quotient* (IQ) of each child.^{17,18} Based on the results of the Wilcoxon analysis test, a significant effect can be seen in the *posttest* conducted after the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth".

The results of this study are in line with the results of previous studies which show the use of music or songs in the educational process has a significant effect. The results of research by Rena, *et al* (2019) stated that songs increase knowledge, ability to practice brushing teeth, and can improve the status of dental and oral hygiene in children with *Down syndrome* ($p = 0.001$).¹⁹ Songs are media that make research subjects directly involved in the words and movements contained in the song.¹⁹ This is one of the reasons that the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" can be a significant media in improving the oral health behavior of children with *Down syndrome*.

Diyah, *et al* (2019) in their research stated that motivation to brush teeth by singing was proven effective in improving the teeth brushing skills of elementary school students ($p = 0.000$).²⁰ The results of research by Andreas, *et al* (2019) showed that the singing method was effective in increasing knowledge about how to brush teeth in 91 respondents ($p = 0.000$).²¹ The song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" has differences with previous studies in which this song contains the frequency of brushing teeth, brushing time, duration of brushing teeth, good and bad diets, time to visit the dentist, how to brush teeth, use of toothpaste, maintenance of toothbrushes, and supporting habits when brushing teeth.

The use of songs in several other studies has also shown a significant effect in improving communication skills in vocabulary acquisition in children with *Down syndrome*.²² Songs stimulate the senses of hearing and vision in absorbing information.^{15,23} The practice of brushing teeth derived from songs forms memory and commands the body to do a habit, resulting in increased knowledge, good attitudes, and behavioral changes in brushing skills.^{14,19}

The mechanisms by which music acts on the brain include neuroendocrine mechanisms and neural plasticity.²⁴ Music can trigger neuroendocrine responses that involve various brain structures, especially the limbic system which plays a role in the regulation of emotions and motivation.^{15,16,25} When a person listens to music, there is an increase in functional connectivity between the hippocampus and hypothalamus that can increase feelings of happiness and reduce emotional stress. The limbic system, including the amygdala is involved in the processing of emotions evoked by music. The amygdala responds to various emotional stimuli from music, both positive and negative. Activity in the amygdala may decrease when listening to pleasant music, suggesting that music may regulate emotional responses. In addition, music can also trigger the release of dopamine in the nucleus accumbens area, which is associated with feelings of pleasure and reward.^{15,23} Music also affects the production of steroid hormones such as estrogen and testosterone, which play a role in neurogenesis and neuronal cell protection.²⁵ These hormones facilitate nerve cell regeneration and improve cognitive function and memory.²⁵

Neural plasticity is the brain's ability to change its structure in response to new experiences or learning.²⁴ Music has been shown to cause structural and functional changes in different areas of the brain.^{15,23} These include increased neuronal connectivity and the formation of new synapses, known as neuroplasticity. Music interventions can strengthen connections between neurons and improve cognitive and motor abilities.^{2,15,24,25} Neuroplasticity is also linked to improved cognitive functions such as attention and memory.²⁶ Overall, the interaction between neuroendocrine mechanisms and neural plasticity creates an environment where music not only entertains but also serves as a powerful therapeutic tool to improve mental and physical health.^{25,26}

In conclusion, there is an effect of using the song "SIKAT GIGIMU: Our Beautiful Smile with Healthy Teeth" on improving the oral health behavior of children with *Down syndrome*.

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