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Music as a pedagogical tool in oral health literacy in children

A música como instrumento pedagógico no alfabetismo em saúde bucal de crianças

La música como herramienta pedagógica en la alfabetización en salud bucal de niños

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Objective: to analyze music as a pedagogical resource for literacy in oral health of children in Elementary School. **Methods:** this is a pilot study, carried out in June 2019, with children aged between 7 and 8 years old, enrolled in a private school in the city of Campina Grande, in the state of Paraíba, Brazil. A song was composed with 10 words from the Rapid Estimate of Adult Literacy in Dentistry. This tool was subsequently used at the first meeting and 15 days later, and the dental biofilm record was applied, through intraoral clinical examination. **Results:** seven children participated in four meetings, and good oral hygiene was observed in the two clinical evaluations. However, a better result was found when reading the 10 words after the intervention with the song, with a statistically significant difference (p=0.001). **Conclusion:** music can be an important tool in the functional oral health literacy of school-aged children, and possibly mobilize and conduct mental operations for a positive performance in relation to oral health.
Descriptors: Pediatric dentistry; Health education, Dental; Music; Literacy.

Objetivo: analisar a música como recurso pedagógico para o alfabetismo em saúde bucal de escolares da educação infantil. **Método:** estudo piloto, realizado junho de 2019, com crianças, entre 7 e 8 anos de idade, matriculadas em uma escola privada na cidade de Campina Grande, PB. Construiu-se uma música com 10 palavras do *Rapid Estimate of Adult Literacy in Dentistry*, com aplicação posterior do instrumento no momento e 15 dias após, com aplicação também do registro de biofilme dentário, através de exame clínico intraoral. **Resultados:** participaram sete crianças em quatro momentos e, observou-se boa higiene oral nas duas avaliações clínicas, porém, identificou-se melhor resultado na leitura das 10 palavras após a intervenção com a música, com diferença estatisticamente significativa (p=0,001). **Conclusão:** a música pode constituir-se um recurso importante no letramento funcional em saúde bucal de crianças em fase escolar, e possivelmente, mobilizar e conduzir operações mentais para uma atuação positiva em relação à saúde bucal.
Descritores: Odontopediatria; Educação em saúde bucal; Música; Alfabetização.

Objetivo: analizar la música como recurso pedagógico para la alfabetización en salud bucal en escolares de educación infantil. **Método:** estudio piloto, realizado en junio de 2019, con niños de 7 a 8 años, matriculados en una escuela privada de la ciudad de Campina Grande, PB, Brasil. Se compuso una canción con 10 palabras del *Rapid Estimate of Adult Literacy in Dentistry*, con aplicación posterior del instrumento en el momento y 15 días después, con aplicación también del registro de biofilm dental, mediante examen clínico intraoral. **Resultados**: participaron siete niños en cuatro momentos y se observó una mejor higiene oral en dos evaluaciones clínicas, además, se identificó un mejor resultado en la lectura de las 10 palabras después de la intervención con música, con una diferencia estadísticamente significativa (p=0,001). **Conclusión**: la música puede ser un recurso importante en la alfabetización funcional en salud bucal de los escolares, y posiblemente movilizar y conducir operaciones mentales para una actuación positiva en relación con la salud bucal.
Descriptores: Odontologia pediátrica; Educación en salud dental; Música; Alfabetización.

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INTRODUCTION

Children's musicalization is an important tool used in the educational process. It allows the child to develop musical sensitivity, concentration, motor coordination, socialization, auditory acuity, respect for themself and their group, dexterity of reasoning, personal discipline, emotional balance, among other qualities that facilitate individual and collective formation[1]. Generally, it triggers a variety of sensory and neurological stimuli, which results in a sensations of relaxation and well-being in the person who listens, in addition to stimulating the systematization of information, promoting meaningful learning[2].

As mentioned in the 1998 Brazilian Theoretical Reference for Early Childhood Education (*Referencial Teórico Nacional para a Educação Infantil*), children's musicalization is an important conductor of knowledge and, in many cases, it is also a support to meet several purposes, such as the formation of habits, attitudes, cognitive behaviors and learning, particularly in the field of logical reasoning, memory, space and abstract reasoning[2].

Information is essential for the growth and development of individuals, and, since children are vulnerable to a low degree of health literacy, intervention in this area is relevant in the search for improvement of oral health indicators and, consequently, of the quality of life of the population[3].

Ideally, the musicalization process takes place at school - the institution responsible for the child's cultural education[4]. The school has the power to take advantage of the influences of music to work on the child's daily actions more effectively[2]. The school should not only prepare the child for the future, but it should also provide joy for the present, and music is an instrument capable of playing this role[5].

The school is a strong ally of health policies, since it can strengthen preventive health concepts and measures[6]. In dentistry, health managers and researchers have been paying close attention to oral health literacy (OHL), due to its great impact on the prevalence of dental cavities in children[7]. In this sense, the construction of playful, low-cost, and simple-to-produce pedagogical resources, such as music, can mediate the learning process of schoolchildren, generating motivation for better oral health conditions[8].

OHL represents the degree to which individuals have the ability to obtain, process, and understand basic information about oral health, prevention, treatment, and dental services[9]. Individuals with high OHL scores have better self-perception of oral health, better oral hygiene, tend to seek dental services more and have better adherence to dental treatments[3].

Preventive-educational dentistry seeks to promote control of diseases that affect the oral cavity and, therefore, compromise the health of the population; which can only be achieved

by continuing education and its mechanisms[10]. In this context, it is already possible to observe preventive activities in dentistry integrated with musical experiences, in view of the sensitivity and sensory experimentation capacity of this tool, which both collaborates in the motor development of human beings and in their inclusion in society[11].

However, its application as an oral health education strategy is still poorly studied. Thus, this work aimed to analyze music as a pedagogical resource for oral health literacy of children in Elementary School.

METHODS

This is a pilot study, whose data collection took place in June 2019, with music as an intervention method. The sample was chosen for convenience sake, with children from 7 to 8 years old, students of the 2nd year of Elementary School, of both sexes, enrolled in a private school, in the city of Campina Grande, in the state of Paraíba, Brazil.

The Rapid Estimate of Adult Literacy in Dentistry (BREALD-30) was used, which represents one of the tools used to analyze the levels of functional oral health literacy, validated for Brazilian Portuguese and that constitutes a quick, simple, reliable and valid tool for adults and teenagers[12].

Children with hearing impairment and also those who were not present at all meetings were excluded. All participants, as well as their legal guardians, were informed about the study's methodology and confirmed their consent. This research was approved by the Research Ethics Committee of the Universidade Estadual da Paraíba (CAAE: 14470519.0.0000.5187, under Approval No.: 3.373524).

The song used in the study was composed by Lucas Barreto, Thayná Tavares and Hugo César. It is a 2-minute song, developed with rhythm, harmony and melody, organized in a entertaining way; and it was played four times in each meeting. Its composition included ten words from the BREALD-30[12] tool: brushing (*escovar*), sugar (*açúcar*), biofilm (*biofilme*), dentition (*dentição*), gums (*gengivas*), restoration (*restauração*), dentures (*dentadura*), mouthwash (*enxaguatório*), bruxism (*bruxismo*) and enamel (*esmalte*). The choice of words was based on their presence in the children's daily lives, through advertisements, experiences in dental offices and/or school lectures.

Música – A força do herói (Letra e Melodia – Lucas Barreto, Thayná Tavares e Hugo César)	*Song - The Hero's Strength (Lyrics and Music - Lucas Barreto, Thayná Tavares and Hugo César*
É hora de escovar dentadura	*It's time to brush the dentures*
Um X no espelho sorriso	*An X on the smile in the mirror*
Vencemos o vilão do açúcar	*We beat the sugar villain*
Minha dentição sem bruxismo	*No bruxism in my teeth*
Bochecha, espuma, enxágua	*Cheek, foam, rinse*
A língua, o dente, a gengiva	*Tongue, teeth, gums*
A força do herói é a escova na mão	*The hero's strength is the brush in their hand*
De tarde, de noite e de dia	*Afternoon, night and day*
A força do herói é a escova na mão	*The hero's strength is the brush in their hand*
De orelha a orelha, sorria!	*From ear to ear, smile!*
Se tem um dentinho doente	*If your tooth is sick*
Uma restauração não se nega	*Don't deny a restoration*
Se borrar o esmalte dos dentes	*If your enamel is smudged*
Não dá pra pedir pra colega	*Don't ask a friend for help*
Em cena o enxaguatório	*Here comes the mouthwash*
Escudo contra o biofilme	*Our shield against biofilm*
A força do herói é a escova na mão	*The hero's strength is the brush in their hand*
De tarde, de noite e de dia	*Afternoon, night and day*
A força do herói é a escova na mão	*The hero's strength is the brush in their hand*
De orelha a orelha, sorria.	*From ear to ear, smile!*

Through the intraoral clinical examination, it was possible to analyze the dental biofilm. The Visible Biofilm Index tool was used, which classifies the biofilm as thin or thick[13], considering the following scores: (0) no visible dental biofilm; (1) thin front and back biofilm; (2) thin front biofilm and thick back biofilm; (3) thick front and back biofilm. The thin biofilm is only visible in dry dental surface and the thick biofilm is easily identified in wet surface, and firmly adheres to the dental surface. The analysis was performed under natural lighting, with the aid of a mobile phone flashlight. For this, the examiner used gauze, a wooden spatula, as well as personal protective equipment.

The partial application of the BREALD-30[12] tool was performed by a single calibrated researcher (E.T.B.N.) and with each child separately. During this activity, the researcher

sequentially presented only the 10 selected words for the song's composition. The children were instructed to mention it if they could not read a word, in which case the next one would be presented.

The activities with the song and the analysis of the dental biofilm were done by the same researcher, who had the help of an assistant to record the data.

To evaluate the effect of the intervention on the reading of selected words from the BREALD-30, McNemar's non-parametric statistical test was used for paired data with a significance level of 5% ($p<0.05$). The analysis was conducted using SPSS Statistics software (SPSS for Windows, version 22.0; IBM Inc., Armonk, NY, USA).

RESULTS

As shown in Table 1, seven children participated in four meetings, of which four were male and three were female, between 7 and 8 years old, all mixed raced (*pardo*).

Table 1. Activities of each meetings with Elementary School children. Campina Grande/PB - Brazil, 2019.

Meeting	Day	Activities
1	0	Intraoral clinical examination; Partial application of the BREALD-30 tool; Presenting and learning the song.
2	6	Presenting and learning the song.
3	8	Presenting and learning the song.
4	15	Intraoral clinical examination; Partial application of the BREALD-30 tool.

Most children presented good oral hygiene in the two examinations performed (first and last meeting), characterized by the absence of visible biofilm or the presence of thin biofilm. Only one child had thick biofilm in the first analysis (Table 2).

Table 2. Dental biofilm scores before and after intervention with the song in Elementary School children. Campina Grande/PB - Brazil, 2019.

Scores	Before intervention	15 days after intervention
(0) No visible dental biofilm	1	3
(1) Thin front and back biofilm	5	4
(2) Thing front biofilm and think back biofilm	1	0
(3) Thick front and back biofilm	0	0

After the intervention with the song, better results were observed in reading the selected words, with a statistically significant difference ($p=0.001$) (Table 3).

Table 3. Results related to the reading of the 10 words of the BREALD-30, before and after the intervention with the song in Elementary School children. Campina Grande/PB - Brazil, 2019.

		AFTER	
		No n(%)	Yes n(%)
BEFORE	No n(%)	17(44.7)	21(55.3)
	Yes n(%)	4 (12.5)	28(87.5)

DISCUSSION

Lifestyle-related behaviors, such as eating habits, poor sleep quality, use of illicit substances, as well as low frequency of physical activities, are becoming increasingly prevalent, especially in populations of low socioeconomic status when compared to more socioeconomically privileged groups, which results in a higher propensity for health complications, something we can see when taking into account the continuous increase in noncommunicable diseases (NCDs)[14].

To address these growing health inequalities, initiatives aimed at health promotion and health education have been recommended. Childhood and adolescence have been identified as life stages in which health promotion actions can have a long lasting impact, on the account that knowledge, values and health behaviors developed during these phases of life are often absorbed and last until adulthood[15].

Thus, it is expected that health promotion activities during early childhood have higher effectiveness when compared to other age groups. Therefore, besides the family, caregivers health institutions and also the professionals in them perform an important role in the search for an adequate level of health literacy and healthy behavior[16-17].

Music has always been part of human society and, lately, research on the perception and processing of this tool has been the subject of research to understand the human brain. Music perception, as well as language processing, involves a hierarchically organized network and the activation of cortical and subcortical brain areas that control auditory perception, semantic processing, and also skills involving attention, memory, and emotion[18-19]. Music-based interventions have been shown to be effective in improving neurocognitive functions including attention, executive functions and memory in various clinical conditions[9,20].

Music as a learning tool is a facilitator of knowledge and can be used in Elementary School. Besides generating emotion, music plays a fundamental role in cognition and can be inserted in any educational environment[20]. When studying the effect of music on the child's cognitive system, it is observed that brain stimuli are intense when the child listens to music with attention and concentration[3].

The role of music in Elementary Education isn't just about its recreational capacity. It is also about its affective power, its importance as a facilitating tool in the learning process, capable of making educational elements, such as school, classes and activities, more joyful and receptive.

In order to have a fruitful use of music in this context, it is important to explore each of the musical elements, which make it possible to work on aspects of the individual formation of the human being, such as: rhythm, which induces body movement; melody, which stimulates affectivity and harmony which, in turn, contributes to the affirmation or restoration of mental order in people[22].

In the composition of the song "*The Hero's Strength*" and it was possible to observe: interest, excitement, involvement of the children when listening to the song, and who always asked to listen to it once again after the four repetitions of each meeting. Musicality and musical repetition during school activities arouse more interest and concentration in children[23].

The literacy process is one of the most important stages in children's learning, considering that it is the first step towards self-knowledge and knowledge of the society in which they are inserted, and it enables them to gain space in social dynamics, which demands a high level of concentration[23]. These aspects guided the choice of age group and school stage of the children, as well as music as a facilitating element for the introduction of literacy in oral health.

When the process of child literacy begins, individuals develop a greater capacity for discipline, but also demonstrate greater disinterest in issues that do not stimulating their concentration, this, tools capable of catching their attention are needed, such as music[23].

Musical activities stimulate memorization, spatial tasks resolution, attention span, categorization and reasoning[24]. The use of musical language facilitated the teaching-learning processes, as results after musical intervention were significantly better when compared to results before the intervention.

Musical activities allow the elaboration of alternative methodologies, help in all phases and stages of the teaching-learning process, that is, they are presented as relevant methodological and pedagogical tools[21].

Artistic methods have been used more and more in therapy and inclusion of the individual in society and in conditioning it for dental treatments[25]. This study has shown that musical intervention presented itself as a facilitating tool in the process of word phonation comprehension through the BREALD-30[10].

The BREALD-30 tool is considered effective, quick, simple and reliable to assess oral health literacy[12]. It was observed that children performed better when reading the 10 selected words after the musical intervention.

The oral health of Brazilian children is still considered a public health issue, which associated factors are linked to socioeconomic, behavioral and cultural contexts[26]. Also, parents' oral health literacy has an impact on their children's oral health[27].

An investigation with 120 children identified a reduction in level of dental plaque after using musical toothbrushes[28]. The deterioration of children's oral hygiene may be related to several factors, such as: lack of encouragement from parents and guardians, inefficiency in health service assistance, lack of cooperation of children during necessary dental care and lack of information about the oral hygiene guidelines[27,29].

Basic information on oral health maintenance and its importance is necessary. This information can be transmitted in a variety of ways. Music, in particular, has proven to be a tool capable of causing emotions, motivation, as well as stimulating memory, directing thoughts and reducing anxiety[30].

CONCLUSION

Music can represent a facilitating instrument in the oral health literacy of school-age children, possibly with positive effects on oral hygiene care.

This study was limited by the number of children surveyed, their oral hygiene condition and possibly the fact that it is a private institution did not allow for variations or broad generalizations. A research with a larger number of participants and in various types of educational institutions is recommended.

On the other hand, this study showed the relevance of music in children's educational space, with the aim of improving oral health care in an entertaining way, as well as emphasizing the school environment as a strong ally to work on health education.

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