

# Teleodontology as a tool for adolescent oral health care

## *Teleodontologia como ferramenta para atenção à saúde bucal do adolescente*

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### ABSTRACT

Adolescence comprises a life cycle with high contact to information and communication technological tools. For this reason, it was decided to incorporate these tools into the oral health work process aimed at this public. The COVID-19 pandemic contextualized the use of digital technological tools in several productive sectors, including oral health care in the Unified Health System. **Objective:** The objective was to stimulate the use of teledentistry in the oral health care of adolescents in Primary Health Care in the Ceará interior. **Methods:** The participants were adolescents between 12 and 15 years old from two micro areas of the territory, in total there are 25 participants. The intervention was divided into three stages: application of an electronic form, creation of an instant messaging application group and creation and expansion of a flow for access to the service. **Results:** The reasons for the dropout in dental consultations by adolescents were the lack of vacancies, long wait and the low number of educational actions aimed at health. In the messaging application group, remote educational activities were carried out, as well as restructuring of the dental care flow with the possibility of scheduling a first appointment through the group. **Conclusion:** The interaction obtained in the intervention favored the improvement of access to dental appointments.

**Indexing terms:** Adolescent. Oral health. Teledentistry.

### RESUMO

*A adolescência compreende um ciclo de vida com alto contato com ferramentas tecnológicas de informação e comunicação. Por este motivo optou-se pela incorporação dessas ferramentas no processo de trabalho em saúde bucal voltado a este público. A pandemia de COVID-19 contextualizou a utilização de ferramentas tecnológicas digitais em diversos setores produtivos, incluindo a assistência à saúde bucal no Sistema Único de Saúde. **Objetivos:** Objetivou-se estimular o uso da teleodontologia na atenção à saúde bucal de adolescentes na Atenção Primária à Saúde do interior do Ceará. **Métodos:** Os participantes foram adolescentes entre 12 e 15 anos de duas microáreas do território, totalizando 25 participantes. A intervenção foi dividida em três etapas: a aplicação de um formulário eletrônico, criação de um grupo de aplicativo de mensagens instantâneas e criação com ampliação de um fluxo para acesso ao serviço. **Resultados:** Os motivos da evasão em consultas odontológicas pelos adolescentes foram a falta de vagas, o longo tempo de espera*

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e o baixo número de ações educativas voltadas à saúde. No grupo do aplicativo de mensagens, foram realizadas atividades educativas remotas, assim como reestruturação do fluxo de atendimento com a possibilidade de marcação de primeira consulta através do grupo.

**Conclusão:** A interação obtida na intervenção favoreceu a melhoria do acesso às consultas odontológicas.

**Termos de indexação:** Adolescente. Saúde bucal. Teleodontologia.

## **INTRODUCTION**

In Brazil, the Child and Adolescent Statute (ECA), Law 8069, 1990, defines adolescence as the age group between twelve to eighteen years [1]. In adolescence, physical changes occur, as well as related aspects to thinking, acting and social performance. In this context, the services of the Unified Health System (SUS) must be sensitive to the level of adolescents participation in the actions developed for the specific needs of this life cycle [2].

COVID-19, a disease caused by SARS-CoV-2 that emerged at the end of year 2019 in China, was declared by the World Health Organization (WHO) as a public health emergency. Among the sanitary measures to control the contagion were included suspension of the conclusion of cycles or academic periods. These determinations caused an interruption in the adolescents routine and social distancing from peers or friends influenced well-being and life quality [3].

This situation implies in the need for attention by health services of Primary Health Care to guarantee longitudinal care for the adolescent life cycle. And it must consider the perceptions and meanings attributed to the disease. Access to health services provides a reduction in the risk of the disease, as well as social factors can determine the level of prevention and care, which are important aspects in approaching adolescents [3].

New forms of health care should be encouraged, to avoid direct contact between professionals and patients. As a result, studies on the use of teledentistry emerged, it is part of the field of knowledge of Information and Communication Technologies (ICT) [4]. Some advantages identified for dental teleconsultations in the telemonitoring process are to generate in patients a participation feeling in the healing process, to increase adherence at treatment and to establish a stronger dentist-patient relationship [4]. Teledentistry is not a tool to replace presential consultation, but an aid to improve access to health services and the professional-patient link.

In Santa Quitéria city, in the Ceará interior, the context of the Francisco de Assis Parente Primary Health Care Unit (UAPS) showed a decrease in the number of adolescents seeking dental care. Seeing that 366 adolescents between 12-15 years old are registered in the territory and in March and April 2021, only 2 dental appointments were carried out for the age group 10 to 14 years old. As adolescents constitute a group of high contact with information and communication technological tools, the need to incorporate this tool in the oral health work process in the period of greater physical restriction in the COVID-19 pandemic was evidenced.

The inclusion of teledentistry in the oral health work process would potentialize the approach of adolescents to dental care. Through the identification of the reasons why they do not seek this assistance, as well as the use of a digital flow to access at health service. This would make it possible to improve self-perception in oral and systemic health through health education, with the consequent reduction, in general, of health problems and improvements in the life quality.

The objective of this study was to encourage the use of teledentistry as an auxiliary technology in the adolescents oral health care.

## **METHODS**

This is a study with a qualitative approach of the research-intervention type, which was approved by the Research Ethics Committee (CEP) of the Ceará School of Public Health under number 4,885,499. The territory was the Francisco de Assis Parente Basic Health Unit, located in the Santa Quitéria city, in the northern region of the Ceará State, Brazil. It comprises 11 districts, namely: Boa Vida, Pedra da Saudade, Cohab, Cinzas, Arco, Manduca Penteadado, Raimundo

Mesquita Sobrinho, Portal das Areias, Areias, Vila Dert and Vila Dilma. Total coverage is 6449 people (until 2021), which is divided into 2 family health teams (eSF) and 1 oral health team (eSB). Accompanied by 10 Community Health Agents, who are divided into 10 micro-areas. There were 50 adolescents in the two micro-areas of reference of this study, with 32 and 18 in each, respectively, under the responsibility of a community health agent X and Y, respectively.

After meeting with parents and/or guardians to explain the project and signing consent and assent terms, the number of participants was defined. As inclusion criteria, participants would need to fit in the age group of 12 to 15 years old and they would need reside in the reference micro-areas. Adolescents with special needs who should receive specialized dental care were excluded from the research.

Into 32 adolescents mapped in X micro-area, 3 of them were excluded because they had moved to another area and 1 was excluded because he needed specialized dental care, due to physical and mental disabilities. The remaining 28 were contacted, but only 16 make an appearance to meeting in order to sign the consent and/or assent terms, and all of them were interested in participating. The reasons for recuse to appear in the meeting were varied, such as because no one had time to go with the adolescent, or because they affirm that adolescent dental treatment was previously carried out in a private network, or they simply did not want to go at the health unit for this purpose. And into 18 adolescents between 12 and 15 years old mapped in Y microarea, one them was excluded because he needed specialized dental care, due to physical and mental disability. The others 17 were contacted, Whether by phone call made by the researcher or through a home visit by the ACS. Of these, only 11 showed interest and appeared the meeting to sign the consent and/or assent terms. And of these 11, after project explanation, only 9 of the adolescents agreed to participate. So, 25 adolescent participants were totaled.

For the purpose of identify the reasons why adolescents do not seek dental care at the UAPS, a form was applied through the Google Forms® digital platform. This form was shared with the participants through a link, sent by a WhatsApp® group. The link was sent accompanied for a compact text containing simple and clear information about access. This access happened in a free way, being able to be executed through computer or cell phone, regardless of the operating system of these equipments. At the end of the study, the collected data were analyzed and distributed in tables

In order to generate motivation in the participants for health care, activities permanent education were carried out through a group of the instant messaging application for cell phones (WhatsApp®). Contents were released weekly. Contents were created and posted by the multidisciplinary team of residents, including the responsible researcher. A video was sent along with a brief text presenting the subject and the health professional who would address it. As well as a link that would give access to a quiz site, called "Quizur"® available at <https://pt.quizur.com/>, and after watching the video, the teenager would play the "Quiz" on the subject of the video and would share your result with the other participants in the group.

The access flow for scheduling of the dental appointment was made by form filling, which was accessed through a Google Forms® link. From this point, the dental appointment was scheduled, collecting information about which procedure the adolescent would have intended to perform, before the dental evaluation, as well as the presence of dental pain and/or other situation that would constitute a case of urgency for dental care.

## RESULTS

Twenty-five adolescents participated in this study, 16 them were from X micro-area and 9 from Y micro-area. The average age was 13.4 years, ranging from 12 to 15 years old, with 16 males and 9 females. The health territory in which the research participants live have a high socioeconomic vulnerability, as can be seen through the reported average family income, in which 48% (12) of the participants affirmed to be less than half minimum wage (550 reais). Another 44% (11), an income of one minimum wage (1100 reais), and only 8% (2) affirmed to have an income between 1 and 2 minimum wage. For 84% (21) of the adolescents, the mother assumed the role of main responsible. About the level of education of the responsible by adolescents, most have low education, 16% (4) of them never studied and 48% (12) only had incomplete elementary school.

To understanding, specifically, the oral health characteristics of the participants, some multiple-choice questions were asked in the form. As for the frequency of visits to the UAPS dentist, the answers were varied, answers predominant with 52% (13) of the total who reported "I don't have an exact frequency, I only go when I notice a problem in the mouth (caries, bad breath, gingival bleeding), but it's always before I feel a toothache." Followed by the answer that "I never looked for it", 24% (6) of the total, which generates an alert and preoccupation, because the age group is already 12 to 15 years old. While 12% (3) of them reported that they sought care only when they felt a toothache, 8% (2) that they go to the dentist once a year and only 4% (1) answered that they seek care every 6 months.

Another question was about the difficulty when trying to schedule dental care, in which 56% (14) of the total reported that they had some type of objection, 28% (7) had no objection and 16% (4) never tried to schedule dental care. From 14 participants in this study who reported difficulty to make appointments, 10 affirmed it was due to vacancies lack and 4 due to a long wait to be called. They were also asked about their self-perception of the need for dental treatment, in this case, 84% (21) of the total think they need some treatment and the other 16% (4) of them that they do not need dental care. Another relevant fact is that 20% (5) of them never went to the dentist in their Health Unit, for thinking they never needed it, for have not had a toothache or for being afraid of the dentist, reasons linked to educational information lack about oral health.

To research participants were offered an appointment for dental treatment, 92% (23) of the total wished to make an appointment and 8% (2) of them refused. The intentions main reported in the form to schedule dental appointment were to perform dental cleaning (44%) and to make na dental evaluation (33%).

After the study and characterization of the actors involved, the researchers chose to elaborate action plan. This will aim to identify the reasons that lead adolescents to don't seek dental care at the UAPS, increase the number of educational actions aimed at adolescent health, execute informative acts about the dental care flow, to get the gradual increase in the dental appointments to teenagers and in the vacancies number for local users.

The Situational Strategic Planning (PES) proposal was originally proposed by Carlos Matus [5]. The main characteristics of this approach are: a) understanding that the object of planning are real problems and opportunities for intervention, which exist in a broad reality and not divided into "sectors"; b) the planning process is composed of moments, but these don't have a logic rigid sequential, which makes possible to articulate accumulated experiences; c) the plan remains "modular", and there will be objectives, activities, products, results, people responsible, participants, deadlines and resources at the previded work process . But with flexible organization to facilitate the participation of different social subjects and a temporal spatial ordering according to the strategic design; d) the plan will bring a "theory of government" with spaces for changing the prevailing institutional practices in state organizations with a democratization of relations [5]. Matus [5] built a thinking protocol model based on 4 moments: explanatory, normative, strategic and operational tactical. It prioritizes planning that takes into account the dynamic reality, with the participation of the subjects involved in the process and that seeks to understand each situation within the social, economic and political environment.

For the question studied, the four planning moments will be presented below (chart 1), although sometimes they permeate each other and form part of a whole, without being exactly divided.

It was decided to carry out the analysis about what would be the causes of this problem through the Ishikawa diagram, a graphic tool created by the chemical engineer Kaoru Ishikawa, in 1943. It was known too as the cause and effect diagram, it has a format similar to a fishbone (figure 1), and facilitates the critical analysis, visualization and interpretation of the problem causes [8]. For its effective elaboration, it is essential to follow some steps: Define the problem to be studied, identify the causes in each diagram branch and seek to understand the 'why' of each one of the causes, in order to seek a solution for it [ 8]. These causes were listed before and after the analysis of the online form filled in by the research participants and also through the analysis of the work process at the UAPS.

Chart 1. Didactic scheme of Situational Strategic Planning. Santa Quiteria, CE, 2022.

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EXPLANATORY MOMENT				
<p>In this, it was sought to analyze the health situation, for problems to be identified and prioritized according to importance, urgency and coping capacity. The problem identified and selected for discussion is described in more detail in Table 2 (Ishikawa Diagram).</p> <p>At this point in the PES, it is also necessary to identify critical nodes (causes) that make it difficult to solve the problem addressed. And these were distributed as: immediate causes (the least complex to be solved), intermediate and distant causes (the most difficult to solve):</p> <p><b>Immediate/closer causes:</b> low number of educational actions aimed at adolescent health carried out by the local health team; lack of knowledge on how to schedule an appointment; fear of dental treatment; the lack of knowledge by the oral health team about causes of adolescents evasion to dental appointments.</p> <p><b>Intermediate causes:</b> Difficulties encountered when seeking assistance, such as lack of vacancies and long waiting times.</p> <p><b>Distant causes:</b> low education level of the adult population responsible for adolescents.</p>				
NORMATIVE MOMENT				
<p>This moment will contemplate the elaboration of the objective-situation, built from the decision about what to do in the political time available to the actor to face the selected problems [6].</p> <p>Analyzing the causes related to the problem, it was observed that most of them can be solved, being of low complexity and related to the work process of the service professionals and the way life community.</p> <p>For the action plan, the immediate and intermediate causes were selected, due to the coping capacity of responsible for the actions. The expected results will be presented through the objectives described in the strategic moment stage, as well as the viability analysis for these results/objectives to be achieved.</p>				
STRATEGIC MOMENT				
<p>This describes the definition of the operations to be carried out (action plans), with the design of the Operation-Problem Modules contemplating the viability analysis of each one proposed operations [6].</p>				
Action Plan 1				
<p><b>Closest causes:</b> The lack of knowledge by the oral health team about evasion causes of adolescents to dental appointments.</p>			<p><b>Objectives:</b> To identify the reasons that lead adolescents not to seek dental care at the UAPS</p>	
<p><b>Responsible or Operation Manager:</b> Resident dentist</p>				
Action 1	Necessary resources	Responsible	Frequency	Mark
To carry out an active search of adolescents aged between 12-15 years old to apply an online form and participate at a project for adolescents	Materials: each participant has a cell phone or computer at home; website Google forms	Resident dentist ACS of the microareas involved	2 months in active search (September and October 2021) After each participant received the link, the form would be answered only once, taking about 5 minutes	At least 50% of teenagers who received the link answer to the form
Action Plan 2				
<p><b>Closest causes:</b> low number of educational actions aimed at adolescent health carried out by the local health team;</p> <p>Lack of knowledge on how to schedule an appointment;</p> <p>Fear of dental treatment</p>	<p><b>Objectives:</b> to increase the number of educational actions, through digital media (teleodontology), aimed at adolescent health; the performance of informational acts, through digital media (teleodontology), sharing how the flow of dental care works; a gradual increase in the number of dental appointments for adolescents.</p>			
<p><b>Responsible or Operation Manager:</b> Resident dentist</p>				

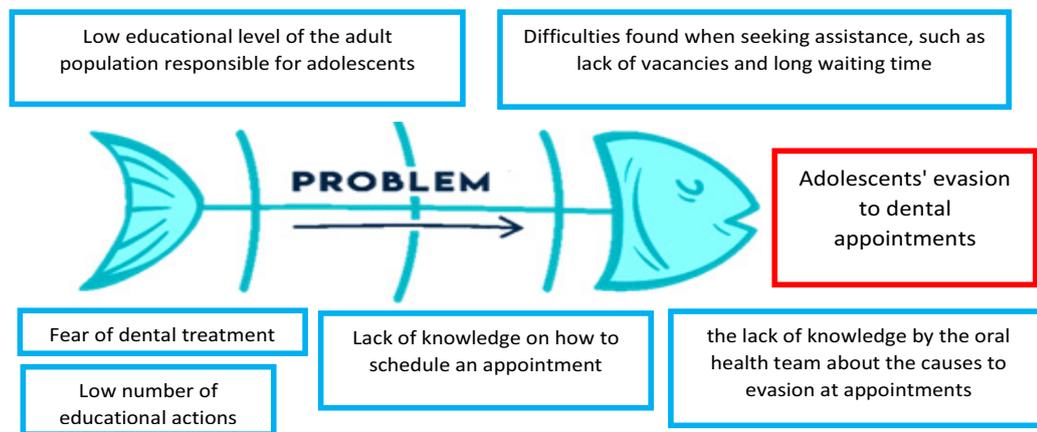
Chart 1. Didactic scheme of Situational Strategic Planning. Santa Quiteria, CE, 2022.

Action 2	Necessary resources	Responsible	Frequency	Mark
Create a WhatsApp Group for teenagers (rotating teenagers between 12 and 15 years old in the territory.) Relevance topics to the age group are addressed, such as adolescence obesity, oral hygiene guidelines, adolescent immunization, prejudice and social inclusion.	Materials: a cell phone capable of Whatsapp in each adolescent user's home; Cell phones of resident professionals; Website "Quizur" for creating games and social interaction. Humans: resident health professionals (dentist, physiotherapist, social worker, nutritionist, psychologist and nurse); ACSS responsible for the 2 micro-areas in which the project operates	Resident health professionals (dentist, physiotherapist, social worker, nutritionist, psychologist and nurse)	One content per week, for 3 months (November 2021 to January 2022)	Interaction between the participants, dentist and ACSSs. And permanence of at least 70% of the participants included  it will be observed if there was an increase of dental consultations for adolescents in this age group over the months.
<b>Activities (digital media contents weekly):</b>				
<ul style="list-style-type: none"> <li>• Oral hygiene orientations</li> <li>• Oral diseases: gingivitis and periodontitis</li> <li>• Obesity in adolescence</li> <li>• Social inclusion and prejudice</li> <li>• Mental health in focus: depression and suicide</li> <li>• Domestic and sexual violence</li> <li>• Immunization in adolescence</li> <li>• Physiotherapy focused on adolescent health: physical exercise and posture</li> <li>• Care of my toothbrush</li> <li>• Myths and truths about oral health.</li> </ul>				
<b>Action Plan 3</b>				
<b>Intermediate cause:</b> low number of vacancies for a high number of users		<b>Expected Result:</b> increase in the number of vacancies for local users and reduction of waiting lines		
<b>Responsible or Operation Manager:</b> UAPS health coordinator				
Action 3	Necessary resources	Responsible	Frequency	Mark
Action: implement another oral health team	Materials: adjustments to the physical structure of the dental office (dental sucker repair and make a purchase of a new dental compressor) Humans: Hire another dentist and oral health auxiliar	Current oral health team Health Unit Coordinator health secretary municipal mayor	-	That the implantation takes place within 6 months after the agreement
<b>Plan viability analysis</b>				
<b>Action 1</b>	The human and material resources are available, being totally plausible of execution.			
<b>Action 2</b>	All resources are available. <u>Barrier:</u> guarantee actions continuity after leaving the current residency group. <u>Justification:</u> action manager is the current dentist resident and the municipality has not received dentistry residents for two years, because this vacancy has not been filled in the selections. There is a high turnover of health professionals at the UAPS, as they are only hired, there are no effective positions. <u>Possible solution:</u> link the project management to the UAPS ACSSs, because almost all of them are effective in the municipal job.			
<b>Action 3</b>	There are no resources available <u>Barrier:</u> lack of financial fund for the purchase of equipment and hiring professionals. <u>Justification:</u> chronic financial problems, such as underfunding of the Unified Health System (SUS), insufficient allocation of budgetary and financial resources to fully comply with the constitutional principles of universal access, integrality and equity [7]. <u>Possible solution:</u> agreement between civil servants (oral health team) and managers (UAPS coordinator, health secretary and municipal mayor) to seek the necessary resources.			

**Chart 1.** Didactic scheme of Situational Strategic Planning. Santa Quitéria, CE, 2022.

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<b>TACTICAL-OPERATIONAL MOMENT</b>
<p>The tactical-operational moment, in turn, corresponds to the execution of actions under the management, monitoring and evaluation of the operations that make up the plan [6].</p> <p>This part corresponds to the detailing of how it will be analyzed and determined whether the planned actions were effective. This effectiveness is based on the goal to be achieved, mentioned at the strategic moment of the plan.</p>

**Figure 1.** Ishikawa diagram of the study in question with causes for the defined problem.

## DISCUSSION

The present study obtained good results in the development, since the difficulties of access were problematized to increase the use of the services. In relation to time to do the first dental appointment, another study carried out in Manaus, Amazonas, also reveals an alert data about the search for the first dental appointment, it was carried out with 103 students between 15-19 years old and 48.6% of them reported never having sought dental care [9].

The difficulty that the participants reported to get to schedule dental care at the UAPS is an important factor to be observed, since that there is a need to reduce barriers to get dental care of easy access. Provided in the SUS principles, determined by Law 8080 of 1990, as the guarantee of universal access to health services and integrality of assistance at all complexity levels of the system [10].

However, the difficulty in scheduling dental care is notable due to the overload of only one oral health team working on site. According to Ordinance number 2,436 of 2017, it is approved the National Primary Healthy Care Policy (PNAB), the registered population by each Primary Care (eAB) and Family Health (eSF) team must vary from 2,000 to a maximum of 3,500 people, located within its territory, guaranteeing the principles and guidelines of Primary Care [11]. And also according to Ordinance SAPS/MS No. 32, of May 19, 2021, which change Ordinance SAPS/MS No. 60, of November 26, 2020, each oral health team (eSB) working 40 hours per week must meet one eSF (40 hours) or two eAB of 20 hours each [12]. At UAPS in question, 6449 people are registered in the territory, which are divided into 2 eSF. And just one eSB for all people of the territory generates a high demand, making unfeasible quick dental care for all people in the territory.

As for the discussion about the PES, it is possible to elucidate some facts about the action plan. For action 1, all (100%) participants who received the link to the form responded it. What made possible the oral health team to know,

discuss and intervene on the reasons that generate evasion of this age group in the search for dental care in the Unit Health. The “Google Forms” tool is used for several purposes, as it is accessible and free. A study that describes its use in the teaching evaluation process, at the Higher School of War from Rio de Janeiro, considers the tool’s advantages to provide greater speed and sustainability to the processes, avoiding the printing of papers [13].

The WhatsApp group showed to be well accepted by the participants, in the case of evaluating the effectiveness of carrying out health education actions through digital media, for adolescents. As for the interaction of adolescents in the group: an average of 50-55% of participants interacted weekly, 32% did not interact, 68% interacted at some point, and 28% were regular, interacting weekly after each publication. At the end execution of the 10 activities, it was verified that 84% remained in the group. The use of the Whatsapp application has been mentioned in other studies as successful experiences of health education. As in a study at Minas Gerais, which used a Whatsapp group to guide people in smoking cessation without the use of drug therapy, and obtained a intervention result in the control and/or smoking cessation of 80% of the users [14]. In another study, in Goiânia, a Whatsapp group with diabetic users, obtained a result of 94.1% of the participants considering that the messages help to clarify doubts about nutrition and diabetes [15]. The cited studies corroborated to the importance of using ICTs for health education, especially in this pandemic time.

There were 10 activities of educational actions in three months (November and December 2021 and January 2022) aimed at the adolescent population of the territory, which had no data in the two previous years (2020 and 2021) of any health education action aimed at these users. As for the number of dental appointments, the comparison that can be made is through the age group established in the health information system, the closest to this study is 10-14 years. For this age group, there is an increase in dental consultations in months of execution of the project actions, while in March and April of the year 2021, only 2 dental consultations were registered for users aged 10-14 years, in the months of November and December, were registered respectively 26 and 31 attendances.

It is also important to highlight the number of dental procedures performed on the participants during the months of project execution, totaling 37 restored teeth (55 dental faces), 9 sealants, 2 delayed dressings, 17 cleanings and 6 extractions dental. Of the 21 participants who started dental care, 19 get complete treatment. Another 2 did not want a dental appointment through the online form filled, and 2 missed the scheduled appointment. Those who did not have completed treatment, it was due to moved to live in another territory and to miss more than 03 dental appointments without justification.

The “Quizur” website, which was used as a choice to assist in the interaction between researcher and research participants, has easy and free access. With several accessibility advantages, as the participant can answer the Quiz generated at any time, just by clicking on the link shared by the Quiz generator (researcher), without the need for prior registration.

And all the results obtained in the project were presented to the UAPS coordination, that showed itself requested to schedule a meeting with municipal managers to discuss the implementation of action 3, which would be the implementation of a new oral health team in the territory.

## **CONCLUSION**

The realization of the project was successful in relation to the identification of the reasons that lead adolescents not to seek dental care at the UAPS. The tool “Google Forms” proved to be satisfactory for collecting information, since it is free and easy to use. UAPS managers need to take into account the importance of carrying out health education actions aimed at this public, because there is great potential for changing lifestyles after acquiring essential information on self-care in health. Since in the question study was possible to promote an increase in the number of dental consultations with the implementation of project actions. More studies are still needed in the literature aimed at health education actions for this age group using digital tools. Through teledentistry, it was possible in the question study to create a

service flow with free and easily accessible resources (Google Forms). The website “Quizur” proved to be a powerful virtual digital tool when used for health education. The low number of vacancies that causes long waiting time for local users is still a challenge in the work process, also dependent on the process of greater investments in equipment aimed at oral health of the SUS.

## Collaborators

MN Mesquita, conceptualization (lead), data curation (lead), investigation (lead), methodology (lead), project administration (lead), resources (equal), supervision (lead), writing - original draft (lead), writing - review & editing (equal). JAC Maciel, formal analysis (lead), supervision (equal), visualization (equal), writing - review & editing (lead). ARC Silva, visualization (equal), writing - review & editing (equal).

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