

# Virtual educational strategy on oral health with elderly patients with periodontal and cardiovascular disease

Estrategia educativa virtual sobre salud bucal con adultos mayores con enfermedad periodontal y cardiovascular

Estratégia virtual de educação para a saúde oral para adultos mais velhos com doença periodontal e cardiovascular

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## Abstract

**i) Introduction:** cardiovascular diseases affect the patients not only because of their heart disease but also because of their oral health. This raises the need to improve knowledge and practices to prevent poor periodontal status from advancing. **ii) Objective:** to implement a virtual educational strategy on oral health with patients with cardiovascular and periodontal disease between 55 and 75 years of age who attend the dental clinic of the Institución Universitaria Visión de las Américas, Pereira branch, in the period 2020-2. **iii) Methodology:** qualitative study with Action Research design. Twelve patients with technological resources participated. **iv) Results:** it was developed in four phases. I) Description of knowledge and practices on oral health: interviews were conducted. II) Planning and formulation of the strategy: patients raised concerns, suggested learning with videos. III) Implementation of the educational strategy: nine educational workshops were held. Serious games, videos, discussions, among others, were used. IV) Compilation of results of the strategy: in spite of the little knowledge of virtuality, the participants were motivated and showed knowledge of the topics. **v) Conclusions:** the virtual educational strategy with a group of elderly adults allowed them to learn how to improve their oral health and develop skills to increase their autonomy in self-care.

**Keywords:** Periodontal diseases; Cardiovascular diseases; Secondary prevention; Patient education as topic; Qualitative research.

## Resumen

**i) Introducción:** las enfermedades cardiovasculares afectan al paciente no solo por su cardiopatía sino también por su salud bucal. Esto plantea la necesidad de mejorar conocimientos y prácticas para evitar que el mal estado periodontal avance. **ii) Objetivo:** implementar una estrategia educativa virtual en salud bucal con pacientes que padecen enfermedad cardiovascular y periodontal entre 55 y 75 años que asisten a la clínica odontológica de la Institución Universitaria Visión de las Américas sede Pereira en el periodo 2020-2. **iii) Metodología:** estudio cualitativo con diseño Investigación Acción. Participaron 12 pacientes que contaron con recursos tecnológicos. **iv) Resultados:** se desarrolló en cuatro fases. I) Descripción de conocimientos y prácticas sobre salud bucal: se efectuaron entrevistas. II) Planeación y formulación de la estrategia: los pacientes plantearon inquietudes, sugirieron aprender con videos. III) Aplicación de la estrategia educativa: se llevaron a cabo nueve talleres pedagógicos. Se usaron videos, juegos serios, conversatorios, entre otros. IV) Recopilación de resultados de la estrategia: a pesar del poco conocimiento de virtualidad los participantes estuvieron motivados, además demostraron conocimiento de los temas. **v) Conclusiones:** la estrategia educativa virtual con adultos mayores permitió adquirir aprendizajes para mejorar su salud bucal y desarrollar habilidades para incrementar su autocuidado.

**Palabras clave:** Enfermedades periodontales; Enfermedades cardiovasculares; Educación para la salud; Prevención secundaria; Educación del paciente<sup>1</sup>.

<sup>1</sup> Los términos clave han sido recuperados a partir del Tesoro DECS.



## Resumo

**i) Introducción:** as doenças cardiovasculares afectam os pacientes não só devido à sua doença cardíaca, mas também devido à sua saúde oral. Isto suscita a necessidade de melhorar os conhecimentos e as práticas para evitar a progressão da doença periodontal. **ii) Objetivo:** implementar uma estratégia educativa virtual em saúde oral com pacientes que sofrem de doença cardiovascular e periodontal entre 55 e 75 anos de idade que frequentam a clínica dentária da Instituição Universitária Visión de las Américas em Pereira no período 2020-2. **iii) Metodología:** estudo qualitativo com um desenho de Investigación-Ação. Participaram 12 pacientes que tiveram acesso a recursos tecnológicos. **iv) Resultados:** O estudo foi desenvolvido em quatro fases. I) Descrição dos saberes e práticas em saúde bucal: foram realizadas entrevistas. II) Planeamento e formulação da estratégia: os pacientes levantaram preocupações, sugeriram a aprendizagem com vídeos. III) Implementação da estratégia educativa: foram realizadas nove oficinas pedagógicas. Foram utilizados vídeos, jogos sérios e discussões, entre outros. IV) Compilação dos resultados da estratégia: apesar do pouco conhecimento da virtualidade, os participantes estavam motivados e demonstraram conhecimento dos temas. **v) Conclusões:** a estratégia educativa virtual com idosos permitiu-lhes adquirir aprendizagens para melhorar a sua saúde oral e desenvolver competências para aumentar o seu autocuidado.

**Palavras-chave:** doença periodontal, doença cardiovascular, educação para a saúde, prevenção secundária, educação do paciente



## INTRODUCCIÓN

Cardiovascular disease (CVD) is the set of disorders of the heart and blood vessels, of which the most prevalent are coronary heart disease and stroke with 80.4% (World Health Organization, 2017). CVD is characterized by the gradual onset of symptoms, its long duration and risks for the patient (Ministry of Health and Social Protection, 2014a). This disease affects the patient not only because of his heart disease but also because of the alteration of his oral health; specifically, there is evidence of a direct relationship with periodontal disease (PD), manifested in lesions present in the tissues that surround and hold the teeth in position, which begins with inflammation of the gums and can then trigger periodontitis (González et al., 2017; Ministry of Health and Social Protection, 2014b).

The relationship between PD and CVD is generated because periodontal pathogens penetrate oral tissues and achieve systemic spread through the bloodstream, which can lead to infection of the vascular epithelium and atherosclerotic plaques. In addition, such pathogens produce various virulence factors that impact the vascular system; this leads to platelet adhesion and the formation of cholesterol lipid deposits that contribute to the appearance of atheromas, which ultimately increases the patient's systemic risk (Anguiano and Zerón, 2015).

The relationship between PD and CVD is generated because periodontal pathogens penetrate oral tissues and achieve systemic dissemination through the bloodstream, which can lead to infection of the vascular epithelium and atherosclerotic plaques. In addition, such pathogens produce various virulence factors that impact the vascular system; this leads to platelet adhesion and the formation of cholesterol lipid deposits that contribute to the appearance of atheromas, ultimately increasing the patient's systemic risk (Anguiano and Zerón, 2015).

On the other hand, both diseases are categorized as public health problems due to the high prevalence and their considerable affection in the adult population (López et al., 2018). For example, a study by the Universidad del Bosque showed an association between ischemic heart disease and different stages of periodontitis that ultimately affect the quality of life of these patients (Mendoza et al., 2020).

Consequently, it is essential to understand the complex relationship between CVD and PD, given that the latter is attracting increasing attention both because of its high prevalence and because it is a modifiable risk factor in the primary and secondary prevention of cardiovascular events (Contreras and Ramírez, 2009). Therefore, knowledge of the interactions between these pathologies contributes to the development of relevant educational interventions, which favors not only the maintenance of systemic health but also oral health, and prevents both diseases from progressing to more aggressive stages (Pueo et al., 2006).

Therefore, it is essential to guide patients with CVD and PD to improve their oral hygiene knowledge and practices. This aspect should be emphasized, since as oral hygiene worsens, the periodontal condition worsens, making it important to apply preventive-curative measures (Pueo, et al., 2006).

Finally, the theoretical approach used in this research was that of electronic health literacy interventions with older adults, which consists of minimizing the obstacles to accessing medical prevention services through the use of electronic and telecommunication devices. In this regard, this model has had positive results in interventions related to health promotion and disease prevention (Pourrazavi et al., 2020).



Therefore, the objective of this study was to design and implement a virtual educational strategy on oral health with patients suffering from cardiovascular and periodontal disease between 55 and 75 years of age who attend the dental clinic of the Institución Universitaria Visión de las Américas, Pereira (Colombia) in the period 2020-2.

## 2. METHODOLOGY

We used a qualitative approach and the Action Research (AR) method, which seeks solutions to local problems and facilitates learning for both participants and researchers through the dialogue of knowledge. This method allows learning by doing, in unity between theory and practice; in it a spiral of cycles of planning, action, observation and reflection is carried out (Montero, 2006).

Patients were selected who attended the dental clinic of the Institución Universitaria Visión de las Américas, Pereira campus, in the period 2020-2, who presented PD and CVD and who were between 55 and 75 years of age. In order to participate in the study, they were required to sign informed consent and to have the necessary technological resources to connect to the virtual activities. People with visual, hearing or cognitive disabilities were not included, nor were those who did not have a family member or friend to help them with the technological tools if they were unable to do so independently. La investigación se dividió en cuatro fases:

I) Description of participants' oral health knowledge and practices, II) Planning and formulation of the oral health education strategy, III) Implementation of the education strategy, IV) Collection of results and learning about participants' knowledge and practices during and after the education strategy.

The research team decided to conduct the project virtually given the health emergency generated by COVID-19. The first step was to seek the medical records of patients who previously accepted through an informed consent for their information to be used in research. Thus, the people who met the inclusion criteria were called, invited to the first meeting in which the objectives and methodology of the project were explained, and the informed consent to participate in the educational strategy was signed.

In Phase I, a survey was conducted to obtain sociodemographic data, which consisted of nine questions in which the following variables were investigated:

- Sección para los participantes: edad, sexo, residencia, escolaridad y actividad/profesión, acceso a Internet, conocimiento de plataformas digitales, acceso a plataformas digitales, apoyo o ayudas, acceso a dispositivos electrónicos. Sección para acompañantes (personas de apoyo para la conexión): relación, edad, nivel educativo, conocimiento de plataformas digitales, acceso a Internet, acceso a dispositivos electrónicos, residencia.
- Section for companions (support persons for the connection): relationship, age, educational level, knowledge of digital platforms, Internet access, access to electronic devices, residence.

Interviews were conducted in which previous knowledge about periodontal diseases, cardiovascular diseases, medications used for the treatment of these pathologies, oral care and hygiene and dental prosthe-



ses, as well as the participants’ proposals for the methodologies of the virtual meetings were investigated. In phase II, the interviews were analyzed as input for the planning of the pedagogical workshops, so that they would respond to the needs and proposals of the participants.

In phase III, nine virtual meetings were held using the technique of pedagogical workshops, each lasting approximately 40 minutes. It should be noted that the planning was adjusted as the meetings took place in this phase with the activation of the cycles proposed in the IA. In phase IV, interviews were again conducted with the same questions as in phase I to compare knowledge and practices before and after the educational intervention. In addition, each pedagogical workshop was monitored to adjust the educational strategy.

The surveys were tabulated and the data collected in the interviews and field diaries were transcribed. The qualitative data analysis was carried out using the Thematic Analysis method (Braun & Clarke, 2006). First, the units of meaning were identified and by comparing them and looking for trends, they were classified into codes. The codes were then collated and assembled into potential themes. These were reviewed in relation to the extracted fragments and the theoretical categories of the research. Afterwards, a name was defined for each code and a description was generated from the grouping of the textual units. Finally, the codes were regrouped into even broader themes that shaped the categories.

The project had minimal risk according to Resolution 8430 of 1993 of the Colombian Ministry of Health and was approved by the Research Ethics Committee of the Institución Universitaria Visión de las Américas.

### 3. RESULTS

Phase I. Description of participants’ oral health knowledge and practices. Virtual meetings were held, which were difficult for the participants due to their unfamiliarity with the Zoom platform; therefore, they required a companion to make the connection in the first meetings. Tables 1 and 2 show the sociodemographic characterization of the participants and their companions. Twelve people participated, three men and nine women, all of them had a smartphone and used the WhatsApp application; only one participant had a computer.

More than half of the companions were grandchildren or children, and most of them were between 18 and 30 years old; it is worth noting that only three people lived with the participants.

The categories of analysis of the interviews are shown below.

**Tabla 1.**

*Características sociodemográficas de los participantes en la estrategia educativa sobre salud bucal.*

Participante	Edad (años)	Sexo	Escolaridad	Actividad/ profesión	Acceso a plataformas digitales y redes sociales
Participante 1	72 años	Mujer	Primaria	Trabajador independiente	No sé utilizar ninguna plataforma

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Participante	Edad (años)	Sexo	Escolaridad	Actividad/ profesión	Acceso a plataformas digitales y redes sociales
Participante 2	75 años	Mujer	Primaria	Otro trabajo	Solo sé utilizar WhatsApp
Participante 3	58 años	Mujer	Primaria	Pensionado	Sé utilizar muy poco WhatsApp y Facebook
Participante 4	60 años	Hombre	Bachillerato	Otro trabajo	Solo sé utilizar WhatsApp
Participante 5	65 años	Hombre	Bachillerato	Pensionado	Sé utilizar muy poco WhatsApp y Facebook
Participante 6	62 años	Mujer	Primaria	Desempleado	Solo sé utilizar WhatsApp
Participante 7	73 años	Hombre	Bachillerato	Otro trabajo	Solo sé utilizar WhatsApp
Participante 8	70 años	Mujer	Bachillerato	Otro trabajo	Solo sé utilizar WhatsApp
Participante 9	60 años	Mujer	Primaria	Otro trabajo	Solo sé utilizar WhatsApp
Participante 10	71 años	Mujer	Bachillerato	Otro trabajo	Solo sé utilizar WhatsApp
Participante 11	63 años	Mujer	Primaria	Otro trabajo.	Solo sé utilizar WhatsApp
Participante 12	61 años	Mujer	Bachillerato	Otro trabajo	Solo sé utilizar WhatsApp

*Cardiovascular disease:* the participants knew some etiologies of the diseases and identified the risk factors; some referred to using natural medicine such as lemon drinks and others had no knowledge of the types of cardiovascular diseases, as it was evident that they excluded arterial hypertension from these. “*La ECV se trata de que llega poco oxígeno al corazón, porque es el que mueve la sangre que va al cerebro*” (hombre, 65 años).

**Tabla 2.**

*Características sociodemográficas de los acompañantes.*

Participante	Parentesco	Edad (años)	Nivel educativo
Participante 1	Nieto-a	Menor de 18 años	Primaria
Participante 2	Otro	30 a 50 años	Bachiller
Participante 3	Hijo-a	18 a 30 años	Profesional
Participante 4	Otro	18 a 30 años	Profesional
Participante 5	Nieto-a	Menor de 18 años	Bachiller
Participante 6	Hijo-a	18 a 30 años	Técnico- tecnólogo
Participante 7	Nieto-a	18 a 30 años	Profesional
Participante 8	Nieto-a	18 a 30 años	Profesional
Participante 9	Nieto-a	18 a 30 años	Técnico- tecnólogo
Participante 10	Nieto-a	18 a 30 años	Profesional
Participante 11	Otro	30 a 50 años	Profesional
Participante 12	Otro	18 a 30 años	Profesional



*"That [CVD] is part of the blood clotting that goes up to the heart and brain and that can give you a heart attack or stroke" (female, 60).*

*Periodontal disease:* they knew that this disease is controlled with hygiene and cleaning performed by dentists; some mentioned that they had undergone treatments such as scaling and root planing at the university dental clinic; therefore, they stated that their teeth were not mobile.

*"I have had my teeth scraped and smoothed 5 years ago and now in college, because my teeth feel very loose, but since I had that done I haven't felt them so loose" (woman, 58 years old).*

*Relationship between CVD-PD:* the interviewees were unaware of the link between the two pathologies, but some stated that their treating physicians recommended frequent visits to the dentist.

*Oral hygiene and care of total prosthesis:* they stated that they had received information on promotion and prevention, some were clear about the frequency of daily brushing. However, there was a lack of knowledge about the daily care of the total prosthesis. *Hábitos saludables:* reconocieron la importancia de realizar actividad física y los riesgos del sedentarismo; respecto a la alimentación, identificaron como saludable la ingesta de verduras, y la comida baja en sal y en azúcar.

*"Eating lots of vegetables, low-salt or low-sugar food, low fat and not smoking" (male, 73 years old).*

*Medications:* the meetings showed that the participants were aware of the management and control of their medications, and they also expressed the importance of taking them every day.

*"I take losartan, hydrochlorothiazide and atorvastatin" (woman, 72 years old).*

*"They gave me aspirin because it makes the blood thinner and more fluid" (man, 65 years old).*

**Phase II. Planning and formulation of the oral health education strategy.** This phase was developed taking into account the results of Phase I. The answers, opinions, doubts and proposals presented by the participants were analyzed. The following are some of the concerns expressed:

*"When you feel so sensitive in your teeth that you can't even touch your upper and lower teeth, what does it mean?" (female, 75 years old)*

*"What are these cardiovascular diseases?" (male, 60 years old)*

*"If I have periodontal disease, can I get cardiovascular disease?" (male, 73 years old)*

*"Can smoking affect gum disease?" (female, 61 years old)*

*"I never take my dentures off to sleep, is that bad?" (male, 60 years old)*

In addition, to the question of how they would like the pedagogical workshops to be carried out, they responded that through videos, images and illustrations.



*"I like it when the activities are with videos or images because I understand things better" (female, 62).*

*"It's good for videos because face-to-face is dangerous at this time for us people who have so many pathologies" (woman, 58 years old).*

Therefore, various activities were planned according to the suggestions and counseling from different health professionals was added. This planning was not done from the beginning of the research, but emerged as the process progressed in cycles, with the participation of the older adults.

**Phase III. Application of the educational strategy.** Nine sessions were held during this phase (see Table 3). It should be noted that the Zoom platform was used in all of them and the videos made by the researchers were shared with the participants via WhatsApp.

**Phase IV. Compilation of results and learning about the knowledge and practices of the participants during and after the educational strategy.**

The use of technological tools generated some difficulties. For example, in certain workshops some people were unable to connect in the absence of their companion, which forced the research team to make a video call via WhatsApp. It should be noted that, despite the age of the older adults, they always showed a positive attitude towards using digital platforms and did not consider them an obstacle in the process.

This strategy also allowed participants to share knowledge and opinions with other people in the same conditions, which helped to build trust and empathy. A catalyst for this process was the game-mediated strategies, which, while fulfilling their pedagogical function, entertained the older adults.

**Tabla 3.**

*Descripción de actividades desarrolladas en la estrategia educativa sobre salud bucal con adultos mayores.*

Actividad	Metodología de actividades sincrónicas y asincrónicas	Material utilizado	Unidades textuales de los participantes
Higiene bucal parte 1	Los investigadores realizaron un video para demostrar el uso adecuado de la seda dental y las técnicas de cepillado con la utilización de un macromodelo y un cepillo dental de gran tamaño. El video fue proyectado en el encuentro virtual. Posteriormente se resolvieron dudas. Como actividad asincrónica se solicitó a los participantes ensayar lo aprendido: uso de seda dental y técnica de cepillado.	Macromodelo y cepillo dental en escala grande, smartphone y software para edición de video.	<i>"En este video me queda claro el uso diario de seda dental" (mujer, 72 años).</i>  <i>"Es importante aprender a cepillar bien los dientes porque yo me lastimo mucho cuando me cepillo, me faltan dientes y siempre se me mete hasta por allá adentro el cepillo" (mujer, 70 años).</i>
Higiene bucal parte 2	Se abordó el tema de tipos de prótesis y sus cuidados mediante una presentación de diapositivas con imágenes y fotografías. Una vez terminada los participantes expusieron sus dudas y se dialogó al respecto. Como actividad asincrónica se invitó a realizar la higiene de sus prótesis según lo aprendido.	Presentación en diapositivas, imágenes, fotografías.	<i>"Con esta presentación aprendí cómo debo cuidar mi prótesis, no lo tenía claro" (mujer, 60 años).</i>  <i>"Me tienen que enseñar con jueguitos porque yo no sé manejar muy bien la tecnología" (mujer, 58 años).</i>



Actividad	Metodología de actividades sincrónicas y asincrónicas	Material utilizado	Unidades textuales de los participantes
¿Dime qué sabes?: crucigrama	Se realizó un crucigrama relacionado con los temas de higiene bucal y prótesis. Una vez acertaban las respuestas se ampliaba la información y se resolvían las dudas. Como actividad asincrónica se solicitó a cada participante realizar un video en el cual mostrara la técnica de cepillado que estaba implementando, el cual debía ser enviado a los investigadores por WhatsApp.	El crucigrama se diseñó en Word.	<p><i>“Esta actividad me gustó porque me pusieron a pensar en la palabra, ustedes dando el significado, muy chévere” (hombre, 73 años).</i></p> <p><i>“Me gustó esta actividad porque pude aclarar los temas y me resolvieron las dudas” (mujer, 62 años).</i></p>
¿Sabes lo que hay dentro de ti y cómo se puede mejorar?	Los investigadores realizaron un video en el cual se explicó qué es la enfermedad periodontal, qué es la enfermedad cardiovascular y cuál es la relación entre las dos enfermedades. La expositora usó una tablet a modo de pizarra para ilustrar con imágenes el tema. Finalmente, los participantes intercambiaron opiniones.	Video realizado con smartphome, software de edición	<p><i>“A mí ya me habían dicho que sufro de eso [EP], pero no sabía que tenía que ver con la presión y con el corazón, ya que por eso [EP] se me aflojan los dientes y me sale mucha sangre” (hombre, 65 años).</i></p> <p><i>“Yo creo que sufrir de las encías puede ser un riesgo para uno, yo presento varias enfermedades y cuando voy al odontólogo les digo: cuidado con la anestesia porque sufro de problemas cardiovasculares y respiratorios” (mujer, 72 años).</i></p>
¿Quieres ser millonario en conocimientos?	Se adaptó el juego “¿Quién quiere ser millonario?”. Se realizaron diapositivas con diferentes preguntas sobre los temas tratados hasta el momento. El comodín consistía en pedirle ayuda a un amigo, el cual hacía referencia a otro participante.	Presentación en diapositivas	<i>“Con este juego me queda muy claro los temas que nos han explicado, sobre todo el de prótesis y la relación de las dos enfermedades” (mujer, 61 años)</i>
Conversatorio sobre salud bucal (odontóloga invitada)	Intervención por parte de una odontóloga, quien habló sobre higiene bucal, cuidados en cavidad bucal y técnicas de cepillado. Después, se realizó una plenaria para aclarar dudas y escuchar opiniones.	Cámara y micrófono del computador o celular	<i>“Muy gratificante que ella nos hablara sobre todos los cuidados bucales y sobre la sensibilidad [dental]” (hombre, 73 años)</i>
Conversatorio acerca de enfermedades sistémicas (médico invitado)	Intervención por parte de un médico, quien habló sobre enfermedades sistémicas y los medicamentos. Posterior a esto se dio un espacio para que el profesional resolviera las dudas de los participantes.	Cámara y micrófono del computador o celular	<i>“El médico me deja claro los riesgos de mis enfermedades y que el medicamento que estoy tomando es el indicado” (hombre, 60 años)</i>
Alcance la estrella del conocimiento	Un investigador pegó en la pared diferentes estrellas con diferentes números, cada una con preguntas de temas tratados anteriormente. De manera aleatoria un participante seleccionaba una estrella diciendo el número. Se procedía a leer la pregunta que debía responder. En caso de no conocer la respuesta se le daba la oportunidad a otro participante. Finalmente, se resolvieron las dudas que hubieran quedado.	Estrellas con papel reciclado, marcadores, cinta, cámara del computador	<p><i>“Ahora sé que al sufrir también de depresión debo poner más cuidado en mi higiene, en mis cuidados y medicamentos” (hombre, 73 años).</i></p> <p><i>“Esta actividad está muy novedosa, me gustó, hay preguntas que me pusieron a pensar, aprendí muchas cosas” (hombre, 60 años)</i></p>
Conversatorio sobre alimentación saludable (nutricionista invitada)	Intervención por parte de una nutricionista, quien habló sobre hábitos alimenticios saludables. Posterior a esto se realizó una plenaria en la que la profesional resolvió las dudas de los participantes.	Cámara y micrófono del computador o celular, plato saludable diseñado con plato plástico e imágenes adheridas.	<p><i>“Pensé que comer carne roja era muy mala, pero la nutricionista me explicó muy bien” (mujer, 63 años)</i></p> <p><i>“Me quedan muy claro todas las porciones que se pueden implementar en las comidas diarias” (hombre, 65 años)</i></p>



Another aspect expressed was learning about the diseases they suffer from, their interrelation, practices to maintain their health and improve their quality of life, which was possible through the different strategies implemented and the interest shown by the participants in the development of the sessions with their interventions. The categories and analysis of the interviews are shown below.

*Cardiovascular disease:* the participants have some knowledge of how they should be controlled and what care to take. Likewise, they know that PD can affect CVD and, after the educational strategy, they were able to explain how this relationship occurs and the importance of controlling both diseases with medication and oral hygiene. "Sé que las enfermedades cardiovasculares son problemas a nivel del corazón que, si no se cuidan, pueden producir infartos y problemas en todo el cuerpo. Se puede controlar no fumando, tomándose el medicamento" (mujer, 60 años).

*"Cardiovascular disease is a heart disease that gives more diseases such as hypertension, poor circulation and others, first of all to treat it you have to go to the doctor, be judicious with the medicine they send you"* (woman, 58 years old).

*Periodontal disease:* it was observed that the participants achieved ownership of the topic and spoke fluently about the symptoms and signs of periodontal disease, referring to it as "inflammation of the gums, bleeding, mobility and tooth loss", and also identified the basic care to maintain oral health, such as proper brushing technique, the use of dental floss and regular appointments with the dentist.

*"Periodontal disease is a problem of the gums because they bleed a lot and the teeth start to move because they lose bone, it gets much better with brushing and with those instrumentals"* (woman, 70 years old).

*"It is a disease that occurs in the mouth and it is because the gums become inflamed, causing the teeth to fall out and the gums to bleed, which is called gingivitis. It can be improved with a good brushing, attending dental checkups, cleaning them with floss"* (man, 73 years old).

*Oral hygiene:* they recognized the basic care they should take to maintain a stable periodontal health; in addition, thanks to the strategy they learned the proper steps to take care of their prosthesis and the benefit they can obtain by putting this knowledge into practice. [¿Cree usted que las prótesis también pueden causar enfermedades en las encías?]

*"Before, I thought no, and that's why I didn't take it off to sleep, because I hadn't been told about it, or maybe I had, but I didn't pay attention, but now, seeing everything that it can cause, I am following all the precautions"* (woman, 71 years old).

*Healthy habits:* it was established that they now identify the ideal healthy habits for their conditions, while affirming that exercise and nutrition are an important component for a good quality of life. "El cigarrillo dejaba la boca mal y empeoraba las bacterias y la cicatrización" (hombre, 60 años).

Finally, the suggestions given by the participants at the end of the educational strategy were aimed at continuing to implement methods that allow them to use electronic media, so that they can be part of a world in which technology is gaining more and more strength. They also recognized that they should put into practice the knowledge acquired so that it can be reflected in their quality of life and health.



#### 4. DISCUSION

The educational strategy that was designed and implemented, in which games and dynamics were adapted through virtuality, was adequate to the needs of the population, taking into account that they were older adults, half of them with a primary school education. This strategy implied a didactic transposition, moving from scientific language to a more common one. It also sought to promote community participation, since in this way it is possible to generate co-production of knowledge. Thus, this project distances itself from the vision that considers that knowledge is transmitted and takes a position that defends the participants as active subjects in the production of knowledge.

In this strategy it was essential to take into account the postulates of health education. According to this, the individual who participates develops skills and abilities that allow him/her to protect his/her health, in addition to discovering his/her needs and seeking to satisfy them. In this process, the person carries out a significant learning process based on his or her experiences and previous knowledge (Ausbubel, 1983), and also through socialization with other participants. Thus, education in this approach gives prominence to the experiences of the subjects, which allows them to reorganize and transform the information during the educational process, thus achieving the necessary learning to prevent the progression of diseases or the emergence of new ones (Riquelme, 2012).

In accordance with the above, the aim is not to prescribe behaviors defined by researchers/educators, but for them to develop a participatory pedagogy in which dialogue with the communities is encouraged, in addition to ensuring that people have their own resources at their disposal and are able to develop skills with which they can make conscious and autonomous decisions about their health (Riquelme, 2012). In Colombia, it was corroborated that dentists have been alien to the approach of oral health education, since in them the curative and assistance perspective prevails (Contreras, 2013). However, it has been shown that this approach generates health-enhancing habits and allows individuals to assume their self-care; in addition, a link is created with the health promoter, experiences are shared and analyzed in a respectful manner and open dialogue is encouraged, leaving aside vertical and imposing communication (Contreras, 2013).

In addition, the health education approach is an optimal tool in research involving communities in which it is desired to promote health behavior change, since it is able to contribute various physical, social and emotional elements that not only generate well-being in the individual, but also promote healthy practices in the family and community environment (Torres et al., 2018). In other words, health is located in its social dimension, that is, in relation to culture, healthy environments, care practices and social relationships as a source of well-being.

Consequently, education in the field of oral health makes it possible to reinforce positive behaviors and promote behavioral changes, provided that the interventions involve understanding the lifestyles, conceptions, needs and fears of the subjects involved, in relation to the health-disease process they are experiencing (Montenegro et al., 2013). Therefore, dentistry, as a branch of health, should focus not only on the restoration, but also on the maintenance of oral health through research such as the present one, in which participatory strategies are used to promote individual transformations and in community contexts.

This research is a proposal in the face of abundant scientific evidence showing that most patients



are unaware of oral health complications that are related to systemic diseases such as type 2 diabetes mellitus; literature that also emphasizes the need to educate patients on oral health, with emphasis on periodontal disease (Poudel et al., 2018; Siddiqi et al., 2019; Sanchez et al., 2017). In this regard, Gurav (2016) notes in his review that educational strategies that include peer support significantly improve chronic health conditions and that smartphones, the Internet, among other communication resources, are tools to improve patients' knowledge, attitudes and practices.

Likewise, participatory educational strategies with a qualitative approach such as the one developed in this study are rarely reported in the literature. In Medellín (Colombia), a study was conducted with a mixed methodology, which included a similar qualitative component, although carried out in person, in which it was reported that the use of play activities with older adults promoted empowerment regarding their oral health and generated a positive perception regarding the educational program (Giraldo and Mejía, 2021). However, Diaz et al. (2016) state that educational interventions in "old age are numerous and have experienced discordant success in achieving NCD (chronic noncommunicable diseases) prevention and control goals," due to inaccuracies in the evaluation of interventions. Despite this, the authors argue that most studies testify that health education in older adults enhances autonomy and human development by obtaining knowledge and tools for conscious decision making about conditions and habits that increase health risks (Díaz et al., 2016).

On the other hand, there is little research related to eHealth literacy in older adults. The scientific literature mentions that virtual interventions are advantageous for participants who, due to their health condition, are limited to attend face-to-face meetings, and reveals that participants' knowledge gradually increases after these (Milos et al., 2019; Pourrazavi et al., 2020). Hence, one of the strengths of the present research is the use of virtual/digital tools and the approach to the relationship between PD and CVD, a topic that was not reported in any of the studies consulted.

Finally, the limitations of this study are related to barriers in the use of technological devices such as computers and smartphones, so participants requested help from family members to establish a connection. In addition, the researchers developed instructional videos and WhatsApp messages, so that companions and older adults could understand the dynamics of each meeting and how to enter. Precisely, the limited use and availability of screens with Internet access made it difficult to have a larger sample.

## 5. CONCLUSIONS

The educational strategy developed with a group of patients suffering from CVD and PD made it possible to explore knowledge and needs related to their pathologies and contributed to the acquisition of knowledge and improvement of oral hygiene practices. Likewise, the participatory approach led to reflections and dialogue of knowledge in the educational process. In addition, this type of strategy demonstrates the necessary articulation between the dental and medical branches in the execution of projects aimed at health care and promotion. Finally, this research confirms the importance of carrying out new studies that implement educational strategies through virtuality with the participation of older adults.



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